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SECTION OF MEDICINE

TUESDAY MORNING, JUNE 17, 1930

THE Section of Medicine of the Massachusetts Medical Society convened in the Memorial Building, Plymouth, at ten-five o'clock, Dr. Francis W. Palfrey, of Boston, Chairman, presiding.

CHAIRMAN PALFREY: *Ladies and Gentlemen of the Massachusetts Medical Society*—First of all, let me thank you on the part of Dr. Hornor and myself for trusting us to arrange this program. In the beginning I must admit that we were somewhat overcome with our responsibilities; but our doubts were soon dispelled when we found that every one of those whom we first selected to invite to read papers at this meeting accepted. This seems to me a high tribute to the prestige of the Massachusetts Medical Society.

Thus it is with a mind at ease that I am able to welcome you to this historic town of Plymouth, —to which so many of us try to trace our ancestry. But a good many tides have come and gone since the Mayflower came in across the flats looking for a rock on which the Pilgrims could land, and times have changed. Surely if any of us had driven into Plymouth at that time without a visible horse, that would have been witcheraft of the worst kind.

Medically also things have changed. Very probably the Pilgrims died of the same diseases of which some of our patients die, though under different names; but of their complaints, there is reason to wonder whether they may not have been different. When their chief danger was starvation, we may suspect that they complained less of dyspepsia; and when they were constantly confronted by the real, external danger that there might be an Indian behind almost any bush, perhaps they directed their minds less toward the suspicion of internal diseases.

It has been the recent custom of the Section of Medicine to devote its meetings to special divisions of the science of medicine. The Massachusetts Medical Society is so organized that the disorders of the nervous system belong in the Section of Medicine; therefore, both for the reason that they have not been discussed in recent years before us, and for the added reason that most internists have a far from complete command of these diseases and disorders of the nervous system, the present program has been planned to focus upon these subjects.

The first paper is by Dr. James B. Ayer, of Boston, "Symptoms and Signs of Tumors Involving the Spinal Cord."

SYMPTOMS AND SIGNS OF TUMORS INVOLVING THE SPINAL CORD*

BY JAMES B. AYER, M.D.†

OPERATIONS for tumors involving the spinal cord are increasingly successful. In the favorable types of tumor the results are little short of miraculous, and not infrequently appear to be permanent. But all depends upon the recognition first of the presence of a tumor, and secondly of its location. To this end it is hoped that the following notes may be of value.

1. MATERIAL

The paper represents a study in retrospect of 64 cases of tumor found at operation (61) and autopsy (3), mostly at the Massachusetts General Hospital, and for the most part known personally to the writer. The 64 cases to be considered fall into four pathological groups:—

Intramedullary tumors, probably all gliomata	18	cases
Meningiomata (neuro-fibroma and arachnoid fibroma)	33	"
Extradural hemangiomata and sarcoma (1)	4	"
Chondromata	9	"

These cases were selected because similar from the diagnostic point of view and because they include types most commonly met with, many of which are favorable from the point of view of operation. A number of cases equally large has been omitted from the present paper, including tumors of the cauda equina, tumors affecting the spine, and acute and chronic infections with cord compression.

The age and sex of these patients yield nothing of diagnostic importance. In all types of

*Read before the Section of Medicine of the Massachusetts Medical Society at its Annual Meeting at Plymouth, June 17, 1930.

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tumor under discussion youth and old age is represented; while 5 years is the youngest and 72 years the oldest, the majority of these patients were in the prime of life. Although 32 were male and 32 female, there was a preponderance of males in the glioma group and of females in the meningioma group. The dorsal cord was the site of tumor in 36 cases, the cervical cord in 26, diffuse in 2.

2. Analysis of Symptoms and Signs

It is certain that an intraspinal tumor may be as large as a robin's egg without giving symptoms or signs of its presence, as was the case in one patient coming to autopsy, but it is usual that a tumor will give rise to two sets of symptoms before attaining this size. In the typical case it has caused pain or sensory disturbance frequently calling attention to its location within the spinal canal, and also has so compressed the spinal cord from within or without that sensory and motor disturbance is seen in parts innervated below it. As the first symptoms are often of great importance in diagnosis it will be of value to chart them:—

First Symptom in 64 Cases

(Coincident symptoms also charted)

	Glioma	Meningioma	Extramedullary	Chondroma
Sensory symptoms				
Root pain	6	15	3	1
"Spinal pain"	7	5		
Numbness and paresthesiae	5	5		2
Motor symptoms				
Paralysis or weakness	2	12	1	4
Spasms or trembling	2			1
Other symptoms				
Unsteady gait		2	1	
Epigastric distress		1		
Headache		1		
Sudden shock				1

Sensory symptoms are seen to be early in appearance. *Pain* is to be expected, usually early. In the history of only six cases it is explicitly stated that pain was absent. So-called "root pain" is undoubtedly caused by direct stimulation of one or more sensory nerve roots, and is an early, persistent and localizing symptom in tumor growing from the sheath of a sensory nerve. But pain of another character, often severe but also described as aching, occurs frequently in low back and down the legs, even when the tumor is at high dorsal or cervical level. This pain, often designated "spinal pain", is less easily explained, and is of no localizing value. In fact it may be misleading, suggesting a diagnosis of sciatica and backstrain or neurosis. Root pain is often induced by coughing, sneezing, grunting and even bending forward. This may come out in the history and should always be sought, or it may be tried on request of the physician during the examination. Viets has shown by lipiodol observations in a case with freely movable cauda tumor that these manoeuvres, all of which make sudden increase in intraspinal fluid pressure, cause an actual displacement of the tumor, thus causing pain by traction or impingement on neighboring sensory nerve roots.

Paresthesiae also may indicate nerve root irritation, although numbness, prickling and tingling more commonly begin in the toes and gradually extend upward over legs, thighs and trunk in a progressive manner. Numbness, objectively demonstrated, is frequent below a tumor, but it always signifies considerable compression or destruction of the cord. The level at which numbness ceases and normal sensation is perceived should always be sought for and recorded. Frequently all forms of sensory stimuli will demonstrate the "Sensory level"; it is usually found that a needle point drawn slowly upward from numb area to normal will give the sharpest line. A zone of hyperalgesia above this level was less frequently mentioned than is usually claimed. Sometimes a level may be shown more strikingly with a cold object, and sometimes the tuning-fork over the vertebral spines is of value. Experience with a level as determined by vasomotor response appeared to add little to other methods. Frequently, even with the greatest care, a sensory level is indefinite, and varies from one examination to the next, and between different observers, and therefore cannot be depended upon for localization.

In this series no sensory level was elicited in 15 cases; it was further shown, as was to be expected, that it is in the case of the extradural tumors in which the most indefinite levels were found. If indefinite at one examination a level of sensory change is likely to be two or three segments too low, and on subsequent examinations the sensory change becomes not only sharper but more accurate. After lumbar puncture, with release of fluid pressure about a tumor and after injection of lipiodol, it is often observed that both the sensory level and root pain become more pronounced.

One more sensory finding is at times of value; with the back bent forward percussion over the vertebral spine at the site of an underlying tumor may elicit discomfort or even sharp pain.

Motor symptoms are always found if the tumor be large enough. In only three cases was there none, in two high cervical cord tumors which were successfully localized by pain, and in a man who was found at autopsy to have an unsuspected cord tumor.

While constant and frequently early in appearance, motor symptoms consist usually of spasticity of the extremities due to cord compression, the only localizing value depending

upon whether the paralysis be spastic paraplegia or quadriplegia, the former suggesting a dorsal tumor, the latter a cervical. Spasticity in one leg in advance of the other, or hemiparesis of arm and leg, has a relative importance in denoting whether a tumor be on right or left side of the cord. Not infrequently in advance of recognizable spasticity, and before the patient complains of any disturbance of gait, lively tendon reflexes and perhaps a Babinski reflex and ankle clonus have been noted. A difference in tendon reflexes, either between the one leg and the other, or between the upper and lower extremities is therefore of some importance. In the same manner there is sometimes valuable evidence to be adduced from the skin reflexes, as when the upper abdominal response is present and the lower absent.

Spasms, cramps and trembling are frequent and very troublesome to patients. These are listed in all of the groups of this series and may be early symptoms. Evidently they signify an irritability of the long motor tracts of the spinal cord. Sudden transitory loss of motor power was recorded in four of the chondroma group, and in no others.

Paralysis with atrophy of arm muscles has at times great localizing value; this was found to be so in four of the meningioma, two of the chondroma, and two of the glioma groups. In one case deltoid atrophy with muscle fibrillation was the sole dependable sign, leading to successful enucleation of a tumor before frank cord compression had occurred.

It is usually said that Brown-Séquard palsy indicates an intramedullary lesion. It is interesting to note that this type of motor-sensory dissociation was also found in four cases of meningioma.

Disturbance of the *Sympathetic Nervous System*. With our rapidly increasing knowledge of the functions of the vegetative nervous system, attention to this field is sure to bring out more significant symptoms and signs than are indicated in this series or mentioned by others in connection with cord tumors. Constipation is almost universal and troublesome and often difficult to overcome. Bladder dysfunction, often coming on early, but never in this group a presenting symptom (as in the case of cauda tumors) is even more distressing. With the onset of frank cord compression difficulty starting the urinary stream is to be expected; with increase in paralysis and anesthesia below the tumor incontinence supervenes. Signs of irritation or more often paralysis of the cervical sympathetic should be looked for. A frank Horner syndrome was observed in only one of the intramedullary cases, in which syringomyelia and accompanying gliotic tumor occurred in the low cervical and upper dorsal cord. Fay's method for determining a sensory level has been mentioned; he covers the trunk with hot cloths and then rapidly cools the skin; at the level of the tumor there is a difference in the appearance of the skin both as to color and goose flesh. Trophic disturbances were not mentioned in any of the 64 cases.

3. METHODS OF STUDY OTHER THAN THE CLINICAL EXAMINATION

It is often true that a diagnosis of cord tumor may be made from history and examination alone; it is likewise true that mistakes have often been made. Negative exploration on the one hand and prolonged observation on the other have in the past been all too frequent. In order to confirm a tentative diagnosis or enhance a suspicion of cord compression, examination of the cerebrospinal fluid should always be carried out.

The *spinal fluid* shows evidence of cord compression, not the presence of tumor, and not its location. And yet, contrary to what might be thought, it may show this evidence before compression has become clinically apparent. The criteria upon which this diagnosis is based are twofold, first, the demonstration of interruption of the fluid pathway in the spinal subarachnoid space, and second, increase in fluid protein which occurs below the obstruction. The tests for both are simple and readily applicable by anybody familiar with the technique of lumbar puncture. Block is demonstrated by failure of the fluid to rise in the spinal manometer on artificially increasing intracranial pressure by bilateral compression of the jugular veins in the neck (Queckenstedt). A partial block may be recognized by a slow rise in the manometer or by rise after a latent period, associated with slow fall or absence of fall after jugular release. In doubtful cases combined cisternal and lumbar punctures with manometric studies give even more dependable evidence; this is the routine test with us. Increase in protein may be demonstrated by any protein precipitant, but a quantitative method is to be preferred, and was used routinely in these cases. The fluid below a tumor is frequently yellow, the hue ranging from pale lemon to orange; the deep yellow fluids, sometimes containing protein only a little less than that of blood serum may clot spontaneously (Froin syndrome). In this series of cases three only failed to show block and increase in protein, 20 cases representing all groups gave xanthochromic fluids, yet yellow fluids were found more frequently in glioma (8 of 18 cases).

X-ray evidence of tumor was found to be almost nil in these types of cases, strikingly different from the positive findings in tumors involving the vertebral bodies. Following the use of lipiodol however, the x-ray assumes an important rôle in localization. Contrary to our earlier impression and to the conclusions of a few writers we have had no serious results from its use, either in any of these cases or others not

here included. That we use it freely is evidenced by the fact that it was injected in 26 of the 64 cases, almost always by the cisternal route. Our interpretation has been largely from plates taken immediately after injection and repeated in one or more days; only recently have we been equipped to carry out fluoroscopic examinations in a satisfactory manner. In the 26 examinations made the localization of the tumor has been accurately placed in all but two. In one case lipiodol failed of arrest at the site of the tumor.

4. DIFFERENTIAL DIAGNOSIS

A proper discussion of the differential diagnosis in connection with this group of cases of cord tumor would call for a presentation of a large chapter in neurology. It is sufficient to call attention to two general groups of diseases with which these cases may be confused.

The first group comprises other forms of cord compression, presenting symptoms and signs simulating closely those given for this series and likewise giving a similar spinal fluid picture. These are the various tumors of the spine, usually metastatic; tuberculosis and osteomyelitis of the vertebrae with abscess formation. These should be suspected by their characteristic x-ray picture, as also should old fractures and dislocations of the spine. We have had numerous examples of syphilitic and meningitic block with transverse myelitic symptoms but these are readily differentiated from tumor by clinical and spinal fluid findings. Epidural infections, both acute and chronic, are rare but give symptoms similar to the group under consideration; they give no certain distinguishing features as opposed to tumor.

A second group of cases comprises a number of degenerative diseases of the spinal cord, in particular multiple sclerosis, hematomyelia and myelitis. Absence of fluid block and relatively normal spinal fluid as a rule readily distinguish these from tumor. Yet in the days before spinal fluid and lipiodol studies a considerable number of such cases, particularly of multiple sclerosis, were included in every surgeon's laminectomies for cord tumor; today this mistake is rare.

5. DISCUSSION AND CONCLUSIONS

The duration of symptoms preceding operation in the groups of tumors under discussion was as follows:—(1) gliomata: 6 weeks to 6 years (average 26 months); (2) fibromata: 5 weeks to 7 years (average 24 months); (3) extradural tumors: 7 weeks to 1 year (average 8 months); (4) chondromata: 3 months to 7 years (average 30 months). It is certain that more than half of these patients should have been operated upon earlier, and it is equally certain, judging by numerous exeellent results from operation, that life and function would thereby have been conserved in some.

Before operation was finally undertaken we find the following treatments given: tampon to uterus, treatment for mucous colitis, extraction of teeth, tonsillectomy, operation for gastric ulcer (not found), treatment for neurosyphilis, fixation of back, thorax and neck for arthritis, removal of tube, ovary and uterus, and of course osteopathy and chiropracty. The writer confesses that he has been guilty of too great conservatism in two of these cases, having treated them for arthritis longer than was indicated.

With due consideration of all clinical facts, and interpretation and correlation with spinal fluid and x-ray data it is reasonable to hope for earlier diagnosis and operation in tumors of the spinal cord.

The writer wishes here to acknowledge with appreciation his close coöperative study of these cases with surgeons, especially with Dr. William J. Mixter.

DISCUSSION

CHAIRMAN PALFREY: The discussion will be opened by one to whom many of us owe a large part of our teaching in neurology, Dr. E. W. Taylor, of Boston.

DR. E. W. TAYLOR, Boston: Comparisons are always dangerous, but I feel quite prepared to say that the progress in the diagnosis, and particularly in the treatment, of spinal cord tumor is one of the brightest pages in the medical history of the last thirty or forty years.

The first successfully operated case was published by Gowers and Horsley in 1888. At the time this case caused much excitement in medical circles throughout Europe since it was considered a foolhardy and in fact an exceedingly dangerous procedure to open the vertebral column for such a purpose. The operation suffered the usual odium which is the common lot of all new and radical procedures of a surgical sort. Fortunately for progress, this first case was entirely successful. The tumor was removed and, if I recall correctly, the patient made a complete recovery.

What I wish to insist upon first and very definitely in the discussion of this paper by Dr. Ayer, is that one can get nowhere in the diagnosis of spinal cord tumors, as in other organic disorders of the nervous system, without being versed in the anatomy and secondarily, of course, in the physiology of the parts involved. The difficulty with most of our diagnoses, of course, is that we are not thoroughly informed about anatomical structure and function. If one has even a fairly rudimentary but at the same time solid knowledge of the anatomy and physiology of the spinal cord, the diagnosis resolves itself into a relatively simple matter.

There was a common mistake made for years to which Dr. Ayer did not allude because it is now a question of past history, namely, that the surgeon operated too low. I recall such a case at the Massachusetts General Hospital. The reason for this was inadequate anatomical knowl-

edge. As the spinal cord passes down in the vertebral canal ending at about the level of the second lumbar vertebra, it is evident that the spinal nerve roots to pass out through the corresponding intervertebral foramina, must run an increasingly long course as they descend in the vertebral canal. From this it naturally arises that tumors or other lesions of the cord give rise to sensory symptoms much below the portion of the cord involved. With modern refinement in diagnosis and the increasing interest which this type of disturbance has aroused there is small danger of such mistakes. There is, however, a certain tendency which should likewise be guarded against, namely, making the diagnosis of cord tumor too often as, for example, there is a tendency to make a diagnosis of multiple sclerosis in a vast variety of conditions simply because multiple sclerosis has become more or less the neurological fashion at the present moment. Mistakes in this regard, however, are becoming much less frequent owing to the technical refinements of diagnosis which have been developed in recent years. For example, lumbar puncture with pressure readings, the use of lipiodol and other means of accurate diagnosis are now in common use.

I wish to allude briefly to two cases which illustrate certain points which Dr. Ayer mentioned in his paper. In both of these cases, a faulty diagnosis was made. The first was a woman who presented a spastic condition of the legs with more or less vague sensory disturbance. Without going into detail my diagnosis at the time was merely a clinical one of ataxic paraplegia. There was, however, the peculiarity of the spasticity in that it was greater on one side than on the other, a matter to which I should have given more attention. A poor prognosis was given and later the patient developed disturbance in the ulnar distribution of one arm which led finally to a diagnosis of presumable cord tumor of the lower cervical region. Dr. W. J. Mixter operated and removed without difficulty a fibromatous tumor originating apparently from the dura and embedding itself in the cord without infiltration. Had this patient been operated on six months before, the cure would have been complete. At last accounts she was rather spastic on one side which condition presumably has persisted.

The primary mistake in this case was discounting the fact that the spasticity was distinctly greater on one side than on the other which rarely happens in primary degeneration of the motor tracts. It is evident, however, that a tumor pressing on one side of the cord will produce more marked spasticity on that side than on the other, hence it is always important to consider the matter of new growth when there is inequality of signs on the two sides. When this is combined with a Brown-Séquard syndrome to which Dr. Ayer alluded the diagnosis is rendered very much more certain. In the case alluded to above, however, the Brown-Séquard syndrome had not developed.

The second case occurred before the time when lumbar puncture was becoming generally used and before we knew anything of the diagnostic refinements which are now matters of common knowledge. The patient developed pain in the sciatic distribution in one leg which later extended to the other. This pain was not properly interpreted. In New York likewise where she went a diagnosis was not made. The pain increased in severity and she finally developed a complete transverse lesion of the cord with the usual absolute loss of sensation and motion below a level at or about the region of the umbilicus. She was pregnant along toward the ninth month and in due time gave birth to a baby without experiencing the slightest pain, the baby being delivered by low forceps. Following this the pain continued with extreme intensity extending further and further upward until finally it reached the cervical region. She then developed a choked disc, a paralysis of the third nerve and other signs of intracranial involvement with pronounced increase of intracranial pressure.

The autopsy showed a tumor obviously beginning in the lower region of the cord extending upward superficially involving the membrane so that the cord was largely surrounded by the tumor mass which was regarded as a sarcoma. The entire vertebral canal in the cervical region was blocked. The escape of cerebrospinal fluid was cut off and a hydrocephalus resulted. In this case a correct diagnosis was not made during life. Undoubtedly this would not have been the case at the present time since lumbar puncture with lipiodol injection would undoubtedly have revealed the block and led to a correct estimate of the situation.

Several points need special emphasis. First, the absolute necessity of applied anatomical knowledge; secondly, suspicion of cord tumor should always be entertained when there is persistent, otherwise unexplained, pain either radiating in special nerve distributions about the body or in the extremities, and tests made which are essential to the establishment of the diagnosis. In the third place, one should always be suspicious of cord tumor when the signs are unequal on the two sides; for example, increased spasticity on one side with pronounced sensory disturbance on the other. Pain and inequality of signs on the two sides are always suggestive of a cord tumor, presumably external to the cord itself. The first step in any diagnosis is the suspicion that a certain condition exists. Many diagnoses are completely missed because one does not think of a possibility which, when brought to the attention, becomes perfectly obvious.

CHAIRMAN PALFREY: It is our misfortune as internists that in many instances of our most

brilliant diagnoses we have to call upon members of the Surgical Section to apply the remedy. In many of Dr. Ayer's cases Dr. W. Jason Mixter, of Boston, has supplied this need and Dr. Mixter will now discuss this paper.

DR. W. JASON MIXTER, Boston: The question of the advance in neurosurgery of the spinal cord today rests not with the surgeon, but with the neurologist, because had it not been for the advance in neurological diagnosis of these lesions, we would be unable to report the cures which we can today, and to my mind the greatest advance which has come has been in the diagnosis through laboratory means, namely, the examination of the cerebrospinal fluid.

Dr. Ayer brought out the extreme length of the duration of symptoms before operation in our series of cases at the Massachusetts General Hospital and that is something we must all take to heart. I believe the medical profession at large must take the blame for this delay rather than the neurologist, because if we were to analyze this group of cases again, counting up the number of days that have elapsed from the time in which those patients were seen by a neurologist until the time of operation, we would find quite a different story.

I think the modern neurologist is on the watch for cord tumor, but the profession at large has not as yet caught on to the fact that these cases occur quite frequently.

The next point I should like to bring out is the question of prognosis. Dr. Ayer spoke of eighteen cases of intramedullary tumor. We must admit that they are to all intents and purposes incurable. At the same time many of them can be markedly relieved, not for a question of weeks, but for years, so that they are well worthy of surgical interference. The cases of extramedullary new growth are almost invariably non-malignant. If removable, and they are usually removable, they are very satisfactory cases. It is only where the compression has lasted for years that improvement does not take place. I believe the important thing is to speed up on the diagnosis of possible cord tumor and then apply the necessary tests to prove this diagnosis.

I think that the common practice of making a diagnosis of multiple sclerosis, or lateral tract degeneration, or of arthritis of the spine, without a lumbar puncture, and treating the patient for two or three years on that basis is all wrong. One must rule out cord tumor before he is justified in treating a case as non-operative.

Dr. Ayer has spoken of the question of mistaken operations in the past and there were many. There is nothing more discouraging in surgery than a negative exploration. Very seldom today do we have a negative exploration. The danger of laminectomy is comparatively slight. I think the mortality of the operation is not any higher than that of cholecystectomy, and the results are good; over 50 per cent of the cases of spinal cord tumor will show either a cure or such marked improvement that they are self-supporting. This advance has come largely through the newer methods of neurology to which we give our thanks.

DR. D. J. FENNELLY, Fall River: The only reason I get up to discuss this is that I believe the particular patient Dr. Ayer was talking about was one I sent up who is to be operated on tomorrow. That particular case was similar to what we were up against in neurology several years ago. We have several patients coming into the hospital at present who have the diagnosis tattooed on their abdomens so that the surgeon won't fail to know their diagnosis.

In this particular case this woman was operated on for appendicitis about six years ago and she had an operation for gallstones in April of this year. She was cystoscoped and tested for kidney condition both of which were negative. I saw her just five days ago and she is now in the hospital and has been studied and an operation is to be performed tomorrow.

The interesting thing to me about this group of cases is that all of the spinal cord tumors that I have seen have been operated on a number of times for other things, not that they were not indicated. Of course this woman probably had a real appendix and did have gallstones, but she was brought back to the hospital the second time because of a so-called embolic process some time after the operation.

I believe definitely that the majority of these cases should be examined earlier for the symptoms of spinal cord disease, namely tumors.

CHAIRMAN PALFREY: I understand that it is the customary procedure for the Chair to appoint a Nominating Committee of three to report at the end of our program of papers. I will appoint Dr. Dwight O'Hara, of Waltham, Dr. Sargent, of Boston, and Dr. Hall, of Boston, to report nominations for Chairman and Secretary for your consideration at the conclusion of the last paper.

There is one more item that is not on the program which I think may well be brought in at this time. Dr. Bigelow, of the State Department of Public Health, has requested an announcement which Dr. Viets will make concerning a new service of the Department.

DIAGNOSTIC SERVICE FOR EPIDEMIC MENINGITIS*

BY HENRY R. VIETS, M.D.†

THE Commissioner of Public Health of Massachusetts has asked me to make a statement in regard to the new diagnostic service for epidemic meningitis which the Department of Public Health is offering to the physicians of Massachusetts. For the last year or two meningitis has been increasing throughout the country. The situation in Massachusetts is not alarming. The Department of Public Health, however, wishing to be prepared for a possible epidemic, has inaugurated a service which aims to assist the practitioner in making the diagnosis and in initiating proper treatment. In the three months of this year since this service has been offered, 75 cases of meningococcus or epidemic meningitis have been reported in Massachusetts. Physicians attending 20 of these asked the Department of Public Health to assist them in the diagnosis, or to aid them in the treatment of some of the complications of the disease. Of these 20 patients, 9 proved to have meningococcus meningitis. The requests came from various parts of the State, including as far West as Greenfield. Four patients were in one family. The 11 other patients had either meningitis due to tuberculosis, streptococcus or pneumococcus, or encephalitis, cerebral apoplexy and similar conditions. All the patients seen had signs of meningeal irritation and with the aid of examination of the spinal fluid a definite diagnosis could be made and the proper treatment instituted.

It would seem as though the service offered by the State had, so far, been effective. The State wishes to continue the service and to extend it as far as seems practicable. The plan is similar to that offered by the Department of Public Health in the case of poliomyelitis and although the two services are distinct, either may be called if there is a reasonable doubt in the mind of the practitioner in regard to whether the patient has poliomyelitis or meningitis. The service is offered free and is meant to be one of the aids to diagnosis which it is rightfully the duty of the Department of Public Health to offer as a means of preventing a serious epidemic disease.

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Discussion

CHAIRMAN PALFREY: Tumors of the spinal cord are not everyday matters in our usual practice, but in the practice of every one of us it is an everyday matter to deal with functional nervous disorders or psychoneuroses. The dealing with those disorders is a department of practice in which I think the medical profession must admit that it is falling far short of ideal accomplishment. Undoubtedly it is due to our shortcomings, or to shortcomings of the sort of which I, for one, plead guilty like that in vogue among the various cults for the psychological management of patients without organic disease. But within the medical profession there is a small group of heroic members who have been making scientific, honest progress in dealing with these disorders; and it is upon these neuropsychiatrists that the medical profession must depend for instruction in new and better methods in order to maintain its control over the department of the functional nervous disorders.

Dr. Lawrence K. Lunt, of Concord, will read a paper on "Psychoneuroses in General Practice."

THE PSYCHONEUROSES IN GENERAL PRACTICE*

BY LAWRENCE K. LUNT, M.D.†

BROADLY speaking, human illnesses can be divided into two main groups,—first, those in which the condition is predominantly physical in its etiology and manifestations, and second, those in which the predominant cause is disturbance of mind. This second group is divided into the Psychoses and Psychoneuroses. The former (the Psychoses) comprise those cases which are more seriously deviated from the so-called "normal" and are perhaps less able to undertake consistently the usual responsibilities of life; while the latter (the Psychoneuroses) are disturbances where the ability to function normally is ordinarily less seriously involved. It is this latter group which the officers of the Section on Medicine have asked me to discuss.

In submitting a division of the Psychoneuroses it must be pointed out that we only occasionally see a case that fits into a single type; so this classification depends primarily on what group of symptoms predominates. Furthermore, it should be realized that the classification, as such, is of relatively secondary importance,—the main point is the type of personality which is reacting to the symptoms. With this in mind we can say that when the symptoms are essentially physical the Psychoneurosis is of the *neurasthenic type;* when they are primarily disturbances of thoughts and feelings, as compulsive or obsessive fears and doubts, it is of the *psychasthenic type.* Closely related to this is the *anxiety neurosis* where excessive and unreasonable fears and apprehensions predominate. A fourth division includes *Hysteria* with its capacity for symp-

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toms of such wide and all-inclusive variety that it almost defies description. It is not necessary to give illustrative cases of these disorders, or to describe them further as every physician has a few or many of them in his practice. Dr. Francis Palfrey, in commenting on these cases has said: "There is a feeling of helplessness towards patients who cannot be relieved by medicine and operations and consequently a tendency to avoid them" and "It seems probable that the general practitioner has less expert knowledge and understanding of the psychoneuroses than of almost any department of medicine and consequently deals with each case more by temporizing than by following any well-considered course."

Let us stop for a moment and consider what attitudes are common towards this type of case—There are two that predominate. First, that neurotic patients are the weaklings, the worthless ones of humanity and, as such, are pests and not worth wasting much time on. It is true that some poor suffering, nervous invalids are pests, and among their number may be found some who are weaklings and for whom no amount of effort seems to avail. But the same can be said of a certain proportion of patients suffering from any other of the numerous illnesses with which man is afflicted, so this is not a good reason for this attitude. It is easy to understand what the real reasons are,—the doctor's interest is elsewhere in the field of medicine, on the heart or lungs or gastro-intestinal tract, so the nervously ill are less challenging to his imagination. Or, as is frequently the case, he is too busy with those who are acutely ill, or sick with a long drawn out or chronic illness, and of necessity he cannot spare adequate time on these other cases. But perhaps the most fundamental reason is the widespread prejudice against the illness itself. This prejudice is excusable in the layman on the basis of ignorance due to the lack of opportunity to understand. And possibly it can be excused in doctors, as we are also subject to human frailties. But surely it is *less* excusable because the doctor is in a position that enables him to see men and women in a broader and more comprehensive way which should result in a more tolerant understanding. Two self-evident facts cannot be put aside: first, that these conditions are true illnesses just as much as are appendicitis and pneumonia,—they are sicknesses of the human being, and second, as true illnesses it is distinctly a function of medicine to care for and treat them.

The *second attitude* is that these functional nervous disorders are always etiologically physical. It is perfectly true that not infrequently a neurosis is started and continued by either a definite or an obscure pathological somatic condition, and furthermore, that in a very large proportion of those cases where the illness is primarily physical there is a brief or prolonged nervous condition that requires some kind of attention. This attention may be merely the optimistic good humor of the doctor, or more painstaking and continued reassurance. It is possible that as our knowledge advances we may find that every neurosis is initiated and maintained because of some yet to be discovered physical condition. But it is an incontrovertible fact that many neurotic illnesses recover full usefulness without the intervention of any other specifically physical therapy than the most general application of the rules of physical hygiene. Of course, each case should be given a careful and complete physical examination, not only for the purpose of discovering a possible pathological condition but also to gain the patient's confidence and to show him, as well as ourselves, that too much is not being taken for granted. Should some mild physical anomaly be found, its actual importance, if any, should be very carefully evaluated before granting it any significance. The day of "curvature of the spine" has about passed except among the pseudo sciences, but "gastroptosis", "autointoxication", "colitis", and "uterine displacements" and other similar general diagnoses seem to be still carrying too much weight as supposed causes for nervous disorders. Unless we get away from this all-or-none principle as to the physical etiology of the neuroses we will continue to find relatively sound individuals laboring under the handicap of some feeble diagnosis and throwing their money away on useless concoctions labeled "medicine".

In the face of either or both of these two attitudes what is happening to the patient's mental state? The doctor, because he is a doctor, is in the eyes of many, endowed with a mystical, almost superhuman, vision and knowledge. What he says *must* be so, therefore, through suggestion by intuition from the attitude, if not by direct statements, the patient absorbs the belief of the doctor. If it is that of the malicious omnipotence of some physical ailment, the patient holds fast to this belief even though there may be scant proof for such a position; and it may take weeks, or even months, to disabuse his mind. If it is that of prejudice the same may be true; but there is superadded either a sense of inferiority at being considered "nervous" or a justifiable irritation at the doctor for not understanding that there is real suffering.

There are plenty of situations where there is reasonable doubt about the nonexistence of disease. But until there is good and sufficient reason for definite physical treatment the wise physician does not emphasize this aspect. He realizes that it is justifiable to treat the situation as mental and that he can thereby bring a greater degree of comfort. It is not an exaggeration to say that many temporary and even permanent invalids are made by an unnecessary emphasis on disorders of physical function.

From these observations in regard to the attitude of the medical mind when faced with such

cases, we arrive at two obvious therapeutic generalizations that have to do with the doctor himself. The first is, of course, that he must approach these cases with the least possible antipathy or prejudice. It is often difficult to be sufficiently free from prejudice, but it is quite possible to recognize it in oneself and, if it cannot be changed, to recommend that someone else take care of the case. We *must* keep in mind that the complainings, the worries, the anxieties and fears, the aches and pains, are symptoms of a very real illness and are by no means only signs of weak character or lack of courage. In the patient's mind his symptoms are confused with himself; he is apt to defend the validity of his sufferings as he defends his firmest moral convictions. The doctor must not allow his mind to be likewise confused. He must, himself, see through and beyond the symptoms to the factors that are causing them. He must see the symptoms as experiences to which a personality is reacting, through which a personality is passing, and he must help the patient to see his illness in this light. Because he is not so much impressed as is the patient with the importance of certain symptoms, need not mean that he is out of sympathy with the patient himself. As Austen Riggs points out, the sympathy is not for the symptoms but for the patient. Sympathy for the symptoms serves only to increase them and prevents the penetration of the smoke screen. The manifestations of these nervous disorders are generally nothing else but the result of the flounderings of a bewildered personality and they cannot be understood or treated unless they are approached with this unprejudiced point of view.

The second generalization is that the doctor must be sure of his ground and have enough confidence in the position that he has taken to carry through a consistent campaign which can be maintained even in the face of honest doubts. But it need not be so consistent that new and important signs will be disregarded. It can be what we might call an open-minded consistency, one which carefully considers the value of any definite changes and makes use of them to chart the course towards the obvious goal—health. Almost every patient appreciates this attitude, although he may be appearing to fight it. He may make it very difficult for us to remember that it is his neurosis that is fighting for its life and not his actual personality apparently fighting to stay sick. Though manifestly inconsistent with health a neurosis may be extraordinarily consistent in itself. Therefore, it must be met by a consistent adversary. In these disorders, while the intellectual capacities of the patient are not functioning efficiently, they are not intrinsically impaired. We find neuroses in individuals of all grades of intelligence; practically all of them will appreciate and be benefited by a consistent course.

Having these general principles in mind we can move to less general aspects of the problem. When the conclusion is reached that what primarily needs treatment is the neurosis, a search must be made for some emotional cause. To be able to assign such a cause it is necessary to be alive to the far-reaching rôle that emotions play in everyday life, and particularly how, when disturbed, they directly affect the bodily mechanisms. Everyone knows of Professor Cannon's pioneer contributions in this regard, and of Pavlov's experiments graphically establishing the important mechanism of "conditioned reflexes". Definite observations and demonstrable proof are constantly giving us further evidence of what we know to be true, that emotions are just as much "physical" as they are "mental", that they are both, and at the same time.—The human stomach, being observed under the fluoroscope, drops suddenly two or three inches when its possessor is startled by the loud sound of a slammed door; the volume of the dog's spleen decreases in proportion to his excitement over his feline enemy.

Different individuals react differently. Although we are built to the same plan we have different capacities for reacting and varying sensitivenesses to the conditions in which we exist and the experiences which overtake us. This person will go through serious financial reverses without losing his stability, but will break under the strain of the illness and death of a parent, whereas we may see another where these results are exactly reversed. It is not an unusual thing to find a man who went through the thick of the War without faltering, developing, years afterwards, a neurosis because of some threat at the integrity of his life. Or we can see an apparently robust individual requiring an unusually long convalescence from a slight illness, and another whose obvious soundness is substantiated by numerous exhaustive physical examinations and yet unable to keep up even a reasonable pace for more than a short time. When the emotional cause is easily seen very often the trouble is quickly over; but in some proud-spirited people legitimate emotional outlet is denied, only to accumulate and cause, some months or a year later, an inability to carry on. These delayed reactions are frequently misunderstood. As a cause of breakdown, the acute emotional disturbance is not so great an offender as the protracted, long-continued emotional conflict. Here we see the result of natural emotional demands either not given adequate outlet or not understood and, therefore, badly managed, or perhaps given too free an outlet but in a way that results in further inner conflicts, and a more complicated tangle.

The importance of getting at the actual basis of the emotional state, of inquiring fully into what has been happening in the patient's life, at the earliest possible moment, especially in young people and children, cannot be stressed too emphatically. The sooner the problem is

brought out into the open the more favorable the chance for solution. Problems may seem to solve themselves but it is well to try and produce a speedier and more complete recovery than that brought about by self-healing. It is of absolutely vital importance that nervous manifestations in children be taken hold of at their first appearance. That this is being more and more appreciated is evident from the success of the great work initiated by Dr. Healy and Dr. Douglas Thom and the many Child Guidance Clinics springing up throughout the country. These are a most important link in the benign circle for, as Dr. Thom writes "The great majority of children with undesirable habits, personality deviations and delinquent trends—are largely the results of the environment in which they have been reared; and the dominating feature of this environment is always the parent". So it is through the child that the parent can be approached. Indeed, a large part of the work in the Child Guidance Clinics is the educating of the parent—and so we get our circle.

A girl of sixteen is found one night violently shaking with a chill, a rapid pulse, no temperature, and no white count, but in a tearful and apprehensive state of mind. The doctor is called, a few questions are asked, a hypodermic of morphia is given and rest and relief are obtained,—temporarily. She has been known to every general and special doctor in town as a "nervous child", and she has been the recipient of the favorite "nerve medicine" of each one, but not a single one has made more than a feeble attempt to find out why she is nervous; nor do any in the sequence of physicians to whom she is solicitously taken by her mother and later by her husband, until she is thirty. Then, for the first time, it is revealed that, at about the age of five, she was subjected to a brief period of homosexual practices by an unscrupulous serving girl and became mortally afraid that in some way she had done a great wrong, thereby conditioning herself to react with an ungovernable fear, not only towards everything that had to do with sex matters, but to almost every other aspect of life as well. Her fervent prayers for help, forgiveness and comfort remaining unanswered, she finally became supremely terrorized at the thought that after all there was no God—hence the chill—and the hypodermic. Had there been adequate medical understanding when this woman first showed her nervous symptoms as a child or even during her teens, had the mother been taught something of how to get at the mental processes of her daughter and learned how *not* to get the neurosis fixed by allowing the situation to be talked over endlessly in the child's presence, it is not unreasonable to suppose that this child would not have grown up with firmly imbedded ideas of inadequacy and guilt that now handicap her, and that she would not be a psychiatric problem.

From this it can perhaps be seen that, with his interest in human beings, his general knowledge of human nature, supplemented by a more specific awareness and watchfulness as to his patient's mental life, made possible by his enviably close association and intimate contact with his patients, the general practitioner can often administer psychiatric first aid that may save from disaster and shape favorably the future course of a human life.

In order to get at the emotional factors behind a nervous disorder, it is necessary to allow the patient to tell his story freely and fully. This is the first actual therapeutic procedure. Should the patient not want to talk or perhaps draw red herrings across the trail, he must be persuasively stimulated to loosen his tongue, to discharge his emotional load. He will do this if he senses the fact that he is going to get a sympathetic hearing and is not made to feel that his troubles are foolish or shameful or unimportant. And, especially emphatically, his symptoms must not be branded as "imaginary". This will almost surely put him on the other side of the fence. If he feels a pain the pain is there, unless he is a malingerer. True, he may give his imagination free play in interpreting his symptoms but that does not make the symptoms, the sensations, imaginary. A throbbing in the abdomen may be interpreted in the lay mind as cancer. The idea of cancer is due to the active imagination but the throbbing sensation is real and will be there as long as his circulation responds to apprehension. So it cannot be overemphasized that sensations are real whether or not there is any obvious physical cause, and that the patient simply must *not* be made to feel that they are imaginary. Their importance should be based on the extent to which they incapacitate the patient. When a self-respecting person is told that the suffering and incapacity he is experiencing is imaginary, he is either going to be made to feel a fool or else he is going to believe that the doctor is a fool, and either state of affairs is deplorable. It would be well if every medical man dropped forever from his professional mind and vocabulary the term "imaginary".

Dr. Charles Macfie Campbell has said that the psychiatrist is able to accomplish such good as he may, largely because he gives the patient an opportunity to talk. It is certainly true that we often see real benefit occur simply by being an actively interested listener for someone who hasn't had such an opportunity before. "Confession is good for the soul" but it is not always only a need for confession as such, but also the chance to externalize by the means of words emotional material that is seething inwardly and demanding expression. If this emotional energy does not find verbal or other outward conveyance it will be automatically discharged over the autonomic nervous system and so produce a disorder in physical function. So long as the emotional need for expression is dammed back just so much more the danger of the functional disorder be-

coming chronic,—the more chronic the condition, the harder to effect improvement.

Generally the patient's story reveals a mind that is incapable, because of lack of experience and immaturity of judgment, to deal adequately with the situation in which he finds himself. The doctor's wider experience and greater maturity of judgment possessed by virtue of his more intensive insight into life, enables him to assist in coördinating and clarifying the confusion in the patient's mind. This indicates the next aspect in therapy, the first being *listening*, the second is *explaining*. Here again we need patience and furthermore, sureness of and confidence in our ground. A knowledge of physiology is here of far greater value than a knowledge of any other of the fundamental medical sciences, but it should include an understanding of the disturbed as well as the undisturbed physical processes. We should know, so far as we humanly can, how the body functions not only when there is peace within its borders but when there is stress and strain; the functions are normal for these disturbed conditions just as they are normal in the undisturbed. It is largely a matter of what we are most used to. We cannot say that a heart beating with more than its usual force and at a more rapid rate is necessarily behaving abnormally. It may be responding perfectly normally to the emotion of fear. So a physiological explanation proving normality as against abnormality, reality instead of imagination, can be a very definite therapeutic agent.

Obviously there must be different methods of explanation gauged for the type of mentality that is to receive it. The same method cannot be used for all cases. The abrupt, dogmatic, strong-arm method may be just the thing for one person but may utterly crush another. The painstaking and kindly technique may be sufficiently forceful or convincing in some cases but a failure in others. Often a combination of the two is successful. Furthermore, it must be borne in mind that an explanation may have to be repeated many times and perhaps in different ways. Because a symptom or syndrome has been once explained away in a manner quite satisfactory to ourselves does not mean that the patient has understood it or even heard it or that it is satisfactory to him. After all, it is the patient that has to be satisfied, so we must see to it that our explanations are acceptable.

In cases where there may be few or no physical symptoms, the so-called "psychasthenic" group, explanation will have to be more complex, and yet explain we must. Here the more knowledge of mental mechanism one has, the more helpful he is going to be. Just the much vaunted "knowledge of human nature" is not enough. One must be familiar with the workings of the subconscious mind. Everyone knows that we walk, gesture, drive cars and do many other things without consciously directing the muscles. Just so do we do a great part of our thinking and feeling. We are urged forward or we are held back by impelling drives within us. So long as these drives are well directed and obtaining a fair share of satisfaction we function reasonably well, for we have fairly fool-proof machines. But when the drives are kept stimulated and satisfaction is denied, friction and conflict ensue, and the process may not be allowed to come into the open on account of false pride or shame. We do not like to allow entrance to our awareness attributes of character of which we cannot approve, so our struggles therewith tend to be kept in the dim light of the subconscious. It is necessary for each of us, if we are to continue a reasonable happiness, to have an opinion of self that enables us to carry on with some confidence and self-reliance. We make every endeavor to maintain at least a good enough opinion of self to allow our getting by; whatever threatens that good opinion is apt normally to be contested. So when in our mental life we feel a pressure of desires of which our ethical training or traditions cannot approve or which cannot be satisfied in any acceptable way we try to put them out of sight. Should they not be easily laid aside they continue as conflicts in our subconsciousness and produce emotional overactivity, with thinking and feeling disturbed because the causes are not understood.

The bewildered mind, unwilling to admit uncomplimentary material, seeks reasons for the unsatisfactory condition and generally produces false reasons, hence the continuance of the disturbance.

There seem to be three main factors that cause most, if not all, of our malfunctioning, first, fear, second, the mating impulse, and third, self-assertion. Upon fear depends basically the continuance of the life of the individual and thus the species; upon the mating impulse rests the responsibility of reproducing the individual; and upon self-assertion lies the burden of keeping the individual satisfied with being an individual. If everyone understood and was unashamed of fear and the sex drive, and could thereby manage these basic forces together with the self-assertive impulse in such a way as to fit harmoniously into the social group, there would be no more psychoneuroses. These drives are all perfectly normal constituents of the human make-up but are so almost universally treated as abnormal or, at least, unworthy of being possessed by a decent human being that anyone who subscribes to this misunderstanding and, at the same time, tries to maintain a decent opinion of himself has very rough going and is an easy prey for the neuroses. It has become the doctor's function to untangle these false conceptions, to get at and explain the normality which has become functionally disordered and to take the third therapeutic step, namely, *reorganization*.

The most effective reorganization occurs when the patient does it with the least help. But the doctor must often show the way, furnish the

initiative, and continue to push till restitution is certain. And we all know some cases, happily a minority, where medical or other encouragement must continue for years or even a lifetime. The process of reorganization is that of persistently getting the patient to discard fallacious beliefs and techniques and to show him, by examples from his own and others' behavior, how he can respond in a more effectual way.

The more humble factors that must be put into effect during treatment are the arrangement, in detail, of a schedule of daily activities balanced between work of some sort, not too much rest, exercise appropriate to the patient's condition, and recreation. The activities must be progressively widened till he is back to normal. It is, perhaps, needless to add that an adequate diet is to be maintained, and medicine only used when honestly needed.

Finally, I wish to emphasize that the general practitioner who shows genuine interest in and tolerance towards those of his patients who are suffering from the neuroses, and who finds enough time to devote to them, is a tremendously effective psychiatric outpost and prevents no small number of nervous breakdowns.

Discussion

Chairman Palfrey: In our struggle to advance our control within the medical profession over the psychoneuroses, a leader not only in this state but in our whole country as well is Dr. C. Macfie Campbell, of Boston, who will open the discussion.

Dr. C. Macfie Campbell, Boston: I think we are all very much indebted to Dr. Lunt for giving us this excellent review of a very important field of medicine. The extent of the field is much more considerable, I think, than is generally recognized.

If you ask Dr. Pratt what the percentage of patients attending the Boston Dispensary is, whose disorders are essentially psychoneurotic, he will give you a very large figure.

At the Cornell Medical Dispensary in New York a review was made of the general run of patients coming for gastric, cardiac, and other complaints, and who were found to have psychoneurotic mechanisms as the basis of these symptoms. It was found there, too, that an extremely large percentage of these patients had nothing wrong with the fundamental mechanism, the gastro-intestinal apparatus, or cardiovascular apparatus, but were, as Dr. Lunt describes, bewildered personalities floundering around; and if there is a very large percentage of such patients who come to hospitals with their symptoms which are gastro-intestinal, cardiovascular, etc., I believe that the same proportions are also to be found in the office of the general practitioner.

The question is, What does the general practitioner do with these patients? What can he be expected to do with them?

Dr. Lunt has emphasized that these patients are essentially suffering not from any pathological physiology, but from their difficulty in meeting life situations. The physician, therefore, has before him the concrete problem of an individual, a personality who is face to face with his own individual life situation.

In regard to that large number of patients, what does the general practitioner do? How does he try to analyze that personality? What investigation does he make into the life situation? Does he ask in every case, or in those cases where the symptoms are not obviously indicative of some somatic disorder, whether the patient has any worries, whether there is any difficulty at home or in his occupation, whether there are emotional residuals from early experiences?

Does he try to see whether the patient is suffering from disturbing, repressed memories, from latent feelings of inferiority, from thwarted ambition? Does he feel competent to do so, and, if he does not, what steps does he take to get a little help in regard to the technic of such an examination?

Professor von Piltz, of Krakow, told me recently that he was so much benefited by the teaching of Forel, at Zürich, by his lectures in psychiatry, so much benefited with regard to the conduct of his own life, that he has made that the center of his psychiatric teaching, so that he tries to impress upon all of his students the necessity of getting some knowledge with regard to their own personality.

Dr. Meyer, at the Johns Hopkins Hospital, makes that one of the central elements in his psychiatric teaching, trying to get his students to review their own personalities, to analyze their own personal equilibrium, to realize in their own individual cases how residuals from past situations and experiences, still exert a certain amount of influence and subtly modify their present attitude toward life and their present values.

I do not believe that a practitioner can make an honest examination of his patient, I do not believe that he can give his patient the most help, if he has himself repressions, sensitive points, topics which he hesitates to discuss and with regard to which he is floundering about just as badly as his patient.

I have had patients referred to me, one especially I remember, where the only reason for the reference was that the topic was a somewhat unpleasant one for discussion and the physician felt that he did not want to touch such an unpleasant topic. He felt that I was a rather hardened individual.

If a patient goes to a physician, and after the ordinary routine review of the physical symptoms the physician is somewhat puzzled and believes that there is some underlying personal

disturbance and some complex factor in the situation, he can be of very great benefit to the patient if he is simple, and honest, and unembarrassed with regard to the main issues of life and wishes to put his knowledge at the disposal of his patient. He may not have studied psychopathology, he may not have traced all the ramifications of the libido in Freudian terminology, he may feel that he has not had as complete a training as the individual who has specialized in that work, but even without a very complete training, he can be of very great assistance to his patient in a great many of his patient's troubles. The trouble is simply repression in a great many of his patients, and what the patient requires most of all is the opportunity for the release of repressed emotion.

If you consider what has been done by nonmedical investigators, not in a hospital, but in a factory, and not by the expenditure of a very large amount of time but of a modest expenditure of it, then the general practitioner can take confidence and can realize that he, too, can perform a large service to the community.

The Western Electric Company at their Hawthorne Works near Chicago wanted to find out what morale meant. They sent some special investigators, non-medical investigators, into the plant to talk to the individual workers by their machines. First of all, they allotted about twenty minutes; later on, the workers having so much to say, I believe they have extended the time to almost two hours. The result of that investigation has been to revolutionize or modify very seriously the whole atmosphere of that plant and make those who are responsible for the personnel and for personnel administration very anxious that all the supervisors should know something about the underlying troubles or ruminations or preoccupations of the workers, and they have organized a scheme for making the interviewing of their workers a systematic procedure.

It may seem some distance from the Western Electric at Chicago to a consulting room in Massachusetts, but the principle, it seems to me, is the same. It is bringing into the life of the individual, whether a patient or a factory worker, an opportunity for talking about whatever is a disturbing factor in the mind of the patient; as Dr. Lunt has emphasized, the symptoms, with which he comes to you, are not his trouble; they are merely indications that there is underlying trouble and that trouble requires to be brought to the surface and ventilated and assimilated with the help of some common sense information with regard to human nature.

So, if the physician, although he is not a psychiatrist, takes his job seriously, asks his patient about some of the main issues in life, gives his patient an honest atmosphere, so that the patient feels he can tell the physician some of his main problems, then you find you have already brought to a very large percentage of your patients, especially to those whose life situations are not too complicated and in whom the passage of time has not made the symptoms too habitual an essential part of their adaptation, the help which they need.

How many patients go to general practitioners and are referred to a great variety of distinguished consultants, and finally come in a more or less mutilated condition to the psychiatrist, without ever having been asked, "What about your sex life?"

Why have these physicians not asked that simple question? Why have they left out of the equation a very important issue of life, one which is most likely to be repressed, one which is most likely to cause nervous disorders? I suppose it is because the distinguished physicians are either embarrassed on the topic or else they have had it brought so seldom to their attention, or had it so little emphasized in their medical course that they feel it is not especially negligent on their part to make no reference to it; and so with regard to the life situation of the patient, I think the physician, the general practitioner, can give his patient a simple and honest atmosphere in which the latter may bring up personal matters that are at the root of his disturbance, matters with regard to the marital situation, factors with regard to the attitude of parent or child, memories from his past experiences, often memories of childhood experiences which, when ventilated, have no great significance, but when repressed are very detrimental.

The general practitioner can, I think, bring these matters before his patient. There are many practical questions, I suppose, that come up that have to be considered. How easy is it for the general practitioner in a town who knows everybody and is known by everybody, how easy is it for him to ask very personal questions, especially when he is accustomed to associate with the patient in a social way? How easy is it when the patient knows the physician's wife, knows all the details of the practitioner's social life, and feels that what is told to the practitioner may be all over the town the next week?

Sometimes patients come a long distance, not because the consultant is so distinguished, but because he does not live in the home town.

There again it is a case of the personality of the physician, of the seriousness with which he deals with the fundamental problems of life, with the degree to which professional discretion has become so much an integral part of his personality that all his patients know they can confide in him with the utmost confidence.

I believe that Dr. Lunt has put before you this morning certain simple procedures, suggestions with regard to technic, which can be utilized by every general practitioner and by those who are working in other specialties than that of nervous and mental disorders. Let the physi-

cian give the patient an opportunity of discussing his difficulties.

In Selma Lagerlof's Jerusalem the farmer leaning on his instrument says, "Strange, when you ask anyone's advice you see yourself what is right. Even while you are asking, you discover all at once what you hadn't been able to find out in three whole years."

After all, it is up to your patient to work out the solution of his life problems. It is not up to you to give the solution of another person's life, but you should give the patient an honest atmosphere in which he can put clearly the problems which are at the root of the symptoms. Maeterlinck in his Wisdom and Destiny gives an excellent formulation of psychogenesis and psychotherapy; he refers to the fact that the fault which you have looked in the face can harm you no more. This is all the more true, when that which has been considered a fault, is on analysis seen to be nothing but an essential component of human nature.

CHAIRMAN PALFREY: On a similar occasion we had a paper by Dr. MacPherson, which Dr. Lunt very ably discussed. Dr. Lunt has now read his paper and I will call on Dr. MacPherson to contribute in the same way.

DR. D. J. MACPHERSON, Boston: *Mr. Chairman,* Dr. Lunt has read a splendid paper, which permits only of amplification. Dr. Campbell has amplified it in a masterly way. It seems to me that it is only possible to bring before you one or two practical points which may be interesting to the practitioner.

The first is that a neurosis is not a diagnosis of exclusion; in other words, after you have carefully gone over a patient and found no physical cause for his symptoms, it does not therefore follow that he must have a neurosis or that his symptoms must be functional in origin. Until you have gone further and unearthed the element of conflict, or stress, or the difficulty under which he is laboring, and find or feel in your own mind that that is adequate to cause symptoms, you have no justification in assuming that you are dealing with a neurosis.

I think it is a failure to consider this point that permits so many cases of early tuberculosis, hyperthyroidism, occasionally pernicious anemia, and brain tumor to be mistaken for neuroses. There are physical illnesses where sometimes for months it is impossible to find organic evidence of the disease. Most of these cases do not show, if you examine them from the psychological point of view, sufficient conflict to justify feeling that the symptoms are due to some abnormality in that field.

The second point I should like to make is with reference to allowing the patient to talk and giving him an opportunity to tell you his worries. A young girl was in my office and I asked her why, she replied, "Oh, my doctor accused me of worrying about something." The interesting part of this answer is the word "accuse."

Very often these patients do not know they are worrying about anything. In many instances their symptoms are either a result of a worry that has been repressed, that is put out of consciousness, or are symbolic of some repressed conflict; thereby releasing the patient's mind from the worry. It is often much better instead of asking the patient, "What are you worrying about?" to start with the hypothesis of conflict and merely throw the conversation back to the events of the period at the time of onset of symptoms, giving the individual an opportunity to state facts rather than to interpret them. They will often, in discussing facts, give you a lead which will enable you to see the source of conflict which has evaded the patient's knowledge.

The third point is that I think the reason a great many practitioners do not have more success in dealing with neuroses is not a lack of interest, nor a lack of knowledge, but it is a fear of the personal relation. There is something impersonal in the relation between doctor and patient which keeps the doctor on a plane superior to or above the individual's personal interests. The doctor can be interested in symptoms and physical signs and he speaks with authority in interpreting them, but a personal interest in the individual's life seems difficult and almost unprofessional. The reasons for that are probably very complex, and in each individual may be different, but I think if you face the necessity of achieving the personal level, realizing that there is nothing to fear and that behavior and emotions can be subject to a scientific interest, it will be very much simpler to get the material for which you are looking.

CHAIRMAN PALFREY: Our next paper is on "Neuritis," by Dr. Frank R. Ober, of Boston.

NEURITIS*

BY FRANK R. OBER, M.D.†

IT may seem anomalous to you that an orthopedic surgeon should attempt to discuss neuritis before a group of medical men. The surgeon sees so many patients with diseases which produce neuritic symptoms that were and still are diagnosed as primary neuritis, that it seems quite to the point to enter into a general discussion of this subject on common ground.

Neuritis as a diagnosis, is probably misused and abused oftener than any other term in med-

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icine, not even excepting rheumatism which is a fairly close second. It has become chronic for many to say neuritis, rheumatism, subdeltoid bursitis and loose sacro-iliac joint, either to cover up ignorance or else perhaps to please a patient's ego with a fancy high sounding name that will roll off his tongue and impress his friends. As a matter of fact, the occurrence of either one of the above conditions is not very common but as a diagnosis they are altogether too common.

There are two main groups of neuritis—one in which it is localized in a single nerve or group of nerves, and another in which a large number of nerves are involved in a more or less symmetrical manner. This paper will be confined to a discussion of the causes, anatomy, symptoms and treatment of the first group, which is known as localized neuritis, and which is too often diagnosed primary neuritis. This type may be due to pressure, disease, or trauma, or the results of trauma outside the spine anywhere along the course of a nerve, to the same causes in the spinal foramina, and in the spinal canal, or to reflex conditions from articular or periarticular disturbances.

Trauma heads the list as a causative factor in the neuritis of the extremities, as for example, mild, long-continued compression of a nerve trunk with a tourniquet. Other frequent causes of neuritis are use of crutches, "Saturday night disease", fractures and dislocations, in which the nerve is contused, lacerated, or stretched. Callus formation in which the nerve is caught, or which narrows a bony groove through which the nerve passes, may cause a slow increasing pressure on the nerve and a consequent irritation of the nerve, which in time becomes inflamed and painful. Dislocations of the shoulder with injury to the brachial plexus, fractures of the humerus with injury to the radial nerve, dislocations and fractures of the elbow joint with injury to the ulnar (more common), the median, and rarely the radial. Injuries to the median are more common in compound fractures through the anterior cubital space.

Infection, which sometimes occurs, may involve the nerve, and in the healing of the wound the nerve is sometimes involved in the scar. Pressure from new growths along the course of the nerve may produce pain. Ganglions when distended may produce neuritic pain the whole length of the neighboring nerve. Tenosynovitis, especially when situated near the end of the radius, is another cause.

A nerve may be injured in some surgical procedures or by the careless method of giving a hypodermic injection. Exposure to cold may be a cause of facial neuritis. One of the most common causes of neuritis is due to pressure on the nerve root in its bony canal from proliferative arthritis.

Cervical rib is another cause; pressure from the rib or the scalenus anticus muscle irritating the brachial plexus. These patients may go for years without symptoms when some long-continued occupation will gradually precipitate them. So-called "writer's cramp" is a very good example. Violinists, barbers and women hairdressers may also suffer from neuritis with an underlying cervical rib as the cause. Severe structural scolioses, in which there is a high cervicodorsal curve, often have painful neuritis with loss of power in the small muscles of the hand and those of the forearm. These patients often have pain under the right shoulder blade.

Intercostal neuritis occurs from arthritis of the thoracic spine and also from rib pressure in scoliosis—the pain may be referred to the abdominal viscera. Patients have been operated upon for gall bladder disease and appendicitis when they were suffering from pressure neuritis in curvature of the spine. Sciatica may be due to arthritis or injuries of the lumbar spine, lumbo-sacral and sacro-iliac joints. The anterior crural, external cutaneous, ilio-inguinal, iliohypogastric, and the superior gluteal nerves may be involved also.

Compression fractures and malignant disease of the spine may give rise to a severe neuritis. Malignant disease of the spine should always be suspected where there is a history of breast or prostatic operations.

Slight fractures and compression fractures of the spine which often are unrecognized may later in the process of healing and in the excessive production of bone cause gradual nerve pressure and neuritis. New growths in the spinal canal may press on the nerve roots in the neighborhood and result in neuritis. The best example of neuritis resulting from periarticular and articular disturbance is seen in some pathological conditions about the shoulder joint. Subdeltoid or subacromial bursitis is an outstanding disease that formerly was practically always diagnosed neuritis, but any condition resulting in atrophy and loss of tone of the shoulder cap muscles may result in neuritis, the pain of which is such a paramount feature that the underlying condition is not sought for or else is neglected.

Pathology. The sheath of the nerve only may be involved in the milder cases; in the moderate cases the fibrous portion of the nerve trunk is affected and in the more severe cases or in systemic diseases the nerve fibers themselves are affected. There may be swelling, redness and edema, and the degree depends on the cause of the disturbance and the situation of the causal lesion.

Symptoms. The symptoms vary with the cause. In fractures and dislocations the pain may be very great. In many cases there is only a slight numbness, tingling, burning and coldness; in others there is a great deal of pain and it may be so severe that the mere touching of the skin over the affected limb cannot be borne. There may be a great deal of muscle spasm in the neighborhood of the affected nerve and there

is often great tenderness along its course. The extremity may swell, especially along the tendon sheaths. If this severe pain persists for a long time the joints of the affected extremity may become stiffened, and in many cases there is great pain on any attempt at active or passive motion.

The muscles supplied by affected nerves may lose their power even in mild cases; it may be difficult to grasp objects with the numb or tingling hand. Atrophy may be extreme. The skin may become glossy and later wrinkled. There is often sweating and the palmar surfaces of the hand and fingers may assume a deep red color. Atrophy of joint cartilages may occur with resulting ankylosis. This is probably truer in those patients where arthritis is the cause of the neuritis. The reflexes may be diminished or lost.

Diagnosis of true neuritis is not very difficult, but it is most important to find the cause, since the neuritis is usually secondary to some lesion that must be treated before one can expect to obtain any result, so, it is highly important to recognize that a complete examination of the tract through which the nerve passes is necessary. In neuritis of the arm, without a history of injury, cervical arthritis is the commonest cause, and this is easily discovered on a simple examination of the motions of the neck; the motion that is always restricted is the lateral, and in obtaining this motion be sure the head is not allowed to rotate because rotation will vitiate the lateral motion. An x-ray will often show spur formation of the cervical vertebrae, and a lateral picture is much more useful than an anterior one. Curiously enough, in early cases of arthritis the spur formation is usually found at the juncture of the fifth and sixth cervical vertebrae, and is often seen before there are evidences of arthritis elsewhere. There may be a very severe neuritis along the posterior thoracic nerve with great pain under the shoulder blade. The *prognosis* as to cure is usually good.

The slight cases last two or three weeks, the moderately severe cases ten to twelve weeks, and the severe cases may go on indefinitely. The prognosis is good in fractures and dislocations if reduced early and there is no great damage. It is good in syphilitic and other tumors if removed by proper measures. It is always bad in malignant disease.

Treatment. Do not be content with relieving the pain. One must search for a possible cause and, if found, take measures to remove it.

Fractures, dislocations, benign tumors, ganglions and infections require surgery. Involvement of nerves in bony or scar tissue demand very careful surgery. When the ulnar nerve is pressed up on in the groove it should be transplanted forward of the internal condyle. Scar tissue pressing on a nerve should be dissected away and the nerve buried in muscular tissue. If arthritis is present the patient's whole system should be investigated in order to find possible sources of the arthritis. Incorrect posture can be corrected by special exercises.

Severe arthritis of the cervical spine should be treated with a Thomas collar or other adequate support.

The so-called "old ladies' neck" can be treated with massage, baking, and neck stretching. Cervical ribs may be removed or the scalenus anticus tendon severed.

The affected arm must be put at rest in a sling or in a splint. I have seen some cases so severe that a sling or a splint could not be tolerated even for a few minutes. These patients can be made comfortable only in bed with a skilful arrangement of pillows. They will not stand heat nor cold; massage will increase the irritation as will also exercises. This treatment can be given only when all the acute symptoms have subsided. The patient should begin in a very mild way to use the muscles for slight movements, increasing gradually if pain does not recur; after this has been going on for some time, gentle massage may be instituted. The pain is often severe enough to require salicylates in the moderate cases, and opium may be necessary at times in the severe cases. If malignancy is the cause we are justified in controlling the pain by any legitimate means.

In severe sciatica the patient must be put to bed. The bed must be firm. The back may be strapped, but if adhesive is not well borne a scultetus binder may be used. When the patient gets up a good fitting corset should be worn. Pain must be controlled by drugs if severe.

Contractures of the fingers, wrists, elbows, shoulders and feet very often occur as a result of severe neuritis and every effort should be made to prevent this by proper splinting. In those cases where the pain is too severe to permit splinting the extremities must be supported in as comfortable a position as possible until the pain has subsided enough to allow the use of more efficient apparatus, and even then one must be *gentle*, since over-anxiety on the part of the physician may cause a recurrence of symptoms. It is usually necessary to wait until all the pain has subsided before corrective measures can be instituted. These measures consist in well-planned exercises to increase the function of the muscles and joints and the application of apparatus designed to maintain all the correction obtained by proper physiotherapy. Patients with acute neuritis usually cannot stand extremes of heat or cold, and massage and manual stretching of the affected parts almost always increases their symptoms.

Summary. Localized neuritis is usually secondary to some other lesion and this must be sought for with diligence. The severe cases need most careful management in order to keep them comfortable. Sleep is very necessary, especially in the long drawn out cases, otherwise neuroses may develop. Strenuous and heroic

measures are to be avoided as they result in no good to the condition or to the patient. The treatment of neuritis as a local process without treating the cause prolongs the suffering and may even result in drug forming habits if due care is not exercised to find and eliminate the primary cause.

Discussion

Dr. Francis C. Hall, Boston: I am told that many years ago at the Massachusetts General Hospital all the patients who had pain down the back of the leg and had a diagnosis made of neuritis of the sciatic nerve were sent to the nerve clinic, but shortly after that it was pointed out that a common cause of this neuritis was arthritis of the lower lumbar vertebrae and the sacro-iliac joints, and the number of patients sent to the nerve clinic shortly after that dropped from ten to one. This shows how a little more exact knowledge leads to fewer diagnoses of neuritis. It may also suggest that arthritis is much more common than we have realized.

Dr. Ober has very well covered the number of causes of neuritis and has pointed out that the diagnosis of neuritis alone should rarely be made. Those of us who have seen a good deal of arthritis and are very much interested in it are constantly seeing patients in whom the diagnosis previously has been made of neuritis, sometimes of bursitis. Sometimes the trouble is bursitis and sometimes postural joint strain, but frequently arthritis, and I want to emphasize this point.

The reasons for this lack of recognition of the arthritis in the early stages seem to be due first to a lack of realization that the arthritis can give pain referred to some distant region, and the joints are, therefore, not examined. The second reason seems to be due to the lack of appreciation of some of the primary early symptoms of arthritis.

Very little has been said in our textbooks about radiculitis due to arthritis. Most of the work seems to have been done in France, but a year ago Gunther and Kerr wrote a very good article calling our attention to the number of cases that one finds with pain referred from the spine to other parts of the body. We are now pretty well familiar with the sciatic pain due to arthritis from the lower back, the lumbar vertebrae and the sacro-iliac joint.

To go away from the spine a moment, I saw just the other day a patient who had had a normal knee baked for several weeks, when the trouble was really in the right hip and almost the same day had a patient who complained of trouble with the feet, but who had both hips involved.

We are still seeing patients who have been operated on for a pathological gallbladder or appendix, whose main trouble eventually proved to be arthritis of the dorsal spine, and lately I have been interested in a group of cases who have been considered to have angina pectoris, whose trouble was due to arthritis of the upper dorsal spine.

As Dr. Ober has said, the cervical spine can give pain referred down the arm, and under the scapula, and I have been interested in a group of patients who have had persistent headache, headache in the back of the head, and also pain over the cheek from cervical arthritis, apparently from irritation of the upper three cervical nerve roots.

The most striking characteristic of early arthritis, it seems to me, is pain at night and early in the morning, getting better as the day wears on. Such pain should be considered as possible arthritis until proved otherwise. We are hoping more and more to see people in the stage of early arthritis or even what we call a pre-arthritic stage, before much is shown by x-ray, and before there is much joint damage. With a better realization of the widespread occurrence of arthritis, this should be possible, and we should more and more prevent real crippling from this disease.

Success in the treatment of arthritis, of course, lies in the early recognition of the disease before there has been joint damage. Having made the diagnosis of arthritis, many will be discouraged and say, "Of course, there is nothing you can do about it, if you do make that diagnosis." Those who have been asked the question as to how many patients there are with arthritis who recover from attacks regardless of treatment, seem to put the figure at 40 to 50 per cent., which at least gives us hope that if we give nature half a chance, the patient will get well. There are several prerequisites, however, in the attainment of a higher percentage of arrested cases and greater optimism with regard to the treatment.

It seems to me the patient with this type of neuritis should be considered sick and not expected to do everything he previously did and yet get well. There is hardly a disease in which we expect that, and yet we constantly say the patient is well except for the joints. If you go into the general health more thoroughly, you usually find that is not the case and the prerequisite is to consider the patient sick and modify his way of living materially, the amount depending on the degree of arthritis, in order that he may get well.

The second point, it seems to me, if we are to get a higher percentage of cures (or "arrested cases," as I like to say) is that we consider each patient a potentially serious case. The third point is to do everything we can to build up the general health of the patient and do nothing, either by allowing the patient to continue full time work or by our treatment, to deplete the patient.

The fourth point I should like to make is

that we get away from the idea that all we have to do is to look for focal infection. Generally the patient is a depleted person. Generally the patient is worn out. Very often the patient is worn out from overwork or worry or sleeplessness, and needs rest. Very frequently the diet is incomplete, badly balanced, or even deficient and needs to be corrected. We are constantly seeing people who do not get outdoors in the sunshine for months at a time. It is possible that this is very important. Many patients are constipated and we need to consider that a symptom and find out why the patient is constipated, in the meantime treating the constipation. Many of the patients have endocrine disturbances; quite a number have thyroid deficiency.

I believe we can arrest many of these cases, and a continuance of this policy in a modified way may prevent the so common recurrence of the attacks.

DR. W. H. ROBEY, Boston: A symptom which did not happen to be mentioned by Dr. Ober but one which every practitioner must think of, is pain in the legs occurring in some elderly people, and which I have seen diagnosed a number of times as neuritis.

The symptoms which Dr. Ober gave for neuritis are frequently the same for impaired circulation in the legs, namely, heat, burning, and pain. The pain comes on at two distinct times: at night when the heart slows down and during the day while walking. The pain at night is analogous to the pain in the heart muscle in cases suffering from angina pectoris due to coronary disease. As the heart slows down during sleep, a condition of ischemia is produced which results in anoxemia of the muscle, and pain results. During walking, a sharp pain may occur in the legs because the muscle cannot receive sufficient blood as a result of the impaired circulation. This symptom is often spoken of as intermittent claudication. Middle-aged and elderly persons with pain in the legs should always be x-rayed, by which means sclerosis of the vessels may be readily seen and will assist the doctor considerably in arriving at a conclusion as to the cause of the pain.

While it is discouraging to find that the blood vessels are inefficient, ordinary arteriosclerosis of the legs rarely leads to gangrene. One of our leading orthopedic surgeons said to a patient of mine: "You will probably go on until the circulation ceases in one foot and then, of course, we can amputate the leg." I don't think we ever need to take the joy out of living for these patients.

CHAIRMAN PALFREY: The last paper is by Dr. George P. Reynolds, of Boston, on "Etiology of Psychoneuroses Encountered in the Practice of Internal Medicine."

THE ETIOLOGY OF PSYCHONEUROSES ENCOUNTERED IN THE PRACTICE OF INTERNAL MEDICINE*

BY GEORGE P. REYNOLDS, M.D.†

A FUNDAMENTAL principle of the treatment of neurosis is based on an explanation to the patient of the evolution of his nervous symptoms from their original sources. Obviously, the first step in this type of therapy is to ascertain the causative factors involved in the individual case. It has, therefore, seemed worth while to endeavor to classify the etiological factors in a series of cases of psychoneurosis, and to gain some idea of the frequency of their incidence.

The following statistics (Table I) are based

TABLE I

Sexual Disturbances			
1	Illicit relations	8	
2	Sexual perversions	4	
3	Unsatisfactory marital relation (Dyspareunia, etc.)	7	
4	Impotentia	2	
5	Sterility	3	
		—	24
Environment			
1	Upbringing (Parents uncongenial, overindulgent, or "anxious")	7	
2	Marital partner uncongenial	14	
3	Social life or occupation uncongenial	18	
		—	39
Fatigue Neuroses			
1	Overwork		
	(a) Mental	0	
	(b) Physical	0	
2	Prolonged anxiety	14	
		—	14
Unstable Nervous Equilibrium			
1	Evidence of Life-long, or Congenital, Nervous Instability	28	
2	Hypochondriacal Invalids	5	
		—	33
Background of Physical Disability			
1	Fear of results of existing organic pathology	24	
2	Nervous exhaustion (from prolonged physical illness or discomfort)	36	
3	Menopause	4	
4	Malnutrition	26	
		—	90
	Total		200

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on the writer's personal observation of 935 unselected medical cases, of which 200, or 21 per cent. were diagnosed as psychoneurosis. Of the total number of unselected medical cases, 586 were observed on the private ward of the Johns Hopkins Hospital, Baltimore, Maryland, and 349 in the practice of internal medicine in Boston, Massachusetts. Thus, the series may be taken as representative of two types of patients, those who are sent to a hospital for diagnosis or treatment, and those who come to the practitioner's office. Of the Johns Hopkins Hospital group 130—or 22 per cent.—were diagnosed psychoneurosis, while 70—or 20 per cent.—of the Boston cases fell into that category.

In attempting to classify these cases of psychoneurosis the writer soon found that they divided themselves, from an etiological point of view, into five main groups. It will be obvious that many cases in the series might be considered to belong in more than one of these, but every effort has been made to evaluate each case carefully and to decide which etiological factor was of chief importance. The case has then been recorded under that factor alone, rather than under two or more different headings.

CLASSIFICATION

These five main divisions, or groups, are as follows:

(A) Cases in which the *sexual life* of the patient seemed to have been the etiological factor.

(B) Instances in which the *environment* of the individual was considered an adequate basis for the neurosis.

(C) The so-called *"fatigue neuroses"*.

(D) Cases in which the patient appeared to have had throughout life such an *unstable nervous equilibrium* that the most trivial addition to the nervous strain of daily life would produce a psychoneurotic state.

(E) Those in which the neurosis seemed to be the direct result of some *organic physical disability*.

DISCUSSION

Concerning the first three groups little need be said in this paper. The influences of the environment, of sexual problems and of chronic fatigue on the production of neuroses are well-known, and have been exhaustively treated in the literature. It is interesting, however, to note that, among the 200 cases in this series, there was not one in which the neurosis could be attributed to simple *"overwork"*, either physical or mental (See Table I). Obviously, this is a contributing cause in many cases, as it tends to lower the physical and nervous resistance of the individual. But, in this series at least, overwork without worry was never the primary etiological factor. On the other hand, *prolonged anxiety* is capable of upsetting the nervous equilibrium of normally stable personalities.

UNSTABLE NERVOUS EQUILIBRIUM

The fourth group is perhaps worthy of a more careful consideration. It may well be argued that no person suffering from a neurosis can be said to have a "stable nervous equilibrium", and therefore, that *all* neuroses might be included under the heading "Unstable Nervous Equilibrium". It would seem, however, that this conception of the etiology of neurosis (which is certainly not an uncommon one) must inevitably tend to militate against the proper treatment of cases and is therefore an unwise one to accept. Preventive Medicine would not have achieved its notable advances had its pioneers believed that every infection must denote a low degree of physical resistance in the patient, without considering such factors as the virulence of the infecting organism and the degree of exposure. There is an analogous situation in the production of a neurosis. Obviously, an individual whose whole nervous balance is upset because a household pet has been killed should not be placed in the same category with one whose neurosis is the result of years of financial, social or physical strain. Therefore, it would seem justifiable to limit this group to cases in which the basis of the neurosis was—to continue the analogy—either a factor of very low "virulence" or one to which there had been only the most remote "exposure",—in other words, to cases whose nervous equilibria were so delicately balanced that really minor disturbances of the daily routine of life were capable of creating a psychoneurosis.

BACKGROUND OF PHYSICAL DISABILITY

This brings us to the last group of the series which I want to discuss in some detail. From the point of view of the practitioner of medicine those cases with a background of physical disability would seem to be the most important of all the neuroses, for their treatment falls into his province rather than that of the psychiatrist, who is seldom fully qualified to deal with organic disease. Moreover, patients with known physical illness usually fail to recognize the neurotic elements in their symptomatology and therefore are not willing to go to the psychiatrist for treatment. Nor should they do so if an internist is available who will take into consideration, *and treat*, the neurotic factor simultaneously with the organic element. But the internist is liable to fail if he does not study carefully all the features of the case before starting to treat it. The difficulty is that the medical practitioner is in danger of becoming too absorbed in the treatment of any obvious organic pathology that he may find, to pay attention to the neurotic symptoms which are its result. On the other hand, if the neurotic element is predominant, it is

equally easy to overlook the apparently trivial physical abnormalities which may have been contributing factors in the disturbance of the nervous equilibrium. In order to steer a middle course between these two common errors, it is well to assume that every case has both an organic and a functional element.

We all know that the patient with a severe organic disease is not so stable nervously as he would be under normal circumstances. The individual with a high fever is restless, irritable, sleepless, and often unduly worried about his own condition. The patient with Graves' Disease is classically nervous and unstable. Such cases we all recognize, and we treat the psychological state as well as the organic, but there are many cases in which the relationship between the two factors is less obvious, and it is in those that we are liable to fail to recognize the full significance of that relationship. This paper is frankly a plea to the practitioner of medicine to evaluate the relative importance of the organic and the functional elements of each case and to treat the two simultaneously.

Now let us consider the various means by which organic disease may produce a psychoneurotic state. In the first place, a neurosis may be developed as the result of a constant fear of impending disaster. For example, the intelligent patient with, let us say, a marked hypertension, or severe diabetes, has a "Sword of Damocles" hanging over him, in the fear of sudden death or invalidism, that is certainly an adequate basis for a profound neurosis. In such a case a brief explanation of the mechanism by which fear may produce symptoms will often help the patient far more than any medical treatment. Secondly, individuals after a prolonged and stormy convalescence from an acute illness may be so nervously exhausted as to make the neurotic element of as great, or even greater importance than the purely physical aspect of the case. The same is true of patients who have suffered from months of pain and disability due to some chronic affection, such as arthritis.

The third subheading serves to remind us of the well-known fact that the physiological changes of the menopause almost always affect the nervous equilibrium to a greater or less extent. True psychoneuroses as a result of these physiological phenomena are common, and are probably closely allied to the neuroses that frequently accompany other disturbances of the endocrine glands.

Finally, the internist frequently sees patients whose complaints are all obviously of neurotic origin, but who, if carefully questioned, will be found to have been "run down" physically for some time before the neurotic symptoms became manifest. The twenty-six cases in this series classified under the subheading "Malnutrition" illustrate this type of case admirably. All of them gave a history of physical fatigue and lack of energy for some months before the onset of the neurosis, most of them had been for some time on a diet deficient in protein or some other essential food, and a surprisingly large proportion of them showed a mild secondary anemia of the type responding well to dietary measures. Furthermore, *all* these cases showed a marked and rapid improvement in their neurotic symptoms *when, and only when,* they had been on a proper régime of rest and diet for a few weeks, and the anemia, if present, had been thus eliminated.

There is one further point in connection with the study of this table that seems worthy of emphasis. In the numerical tabulation of the cases percentages have been omitted purposely, because it was felt that the series was too small to warrant statistical deductions. Nevertheless, it would seem to be significant that of 200 cases of psychoneurosis 90, or nearly one-half were found to have some organic physical disability as the primary etiological factor. This is another potent reason for urging the practitioner to treat both the organic and the functional elements of every case.

Table II is a tabulation, from the same series of cases, of certain physical abnormalities that are found in association with the psychoneuroses. Some of them, you will observe, are merely symptomatic manifestations of the psychoneurotic state, while others are definitely organic phenomena, but may be regarded as etiological factors in the production of the neurosis. No attempt has been made to separate the two types and they are simply listed in order to show those physical conditions which, in this series, seemed to have a definite relation to psychoneurosis. A brief consideration of these factors will suffice.

TABLE II

PHYSICAL FACTORS ASSOCIATED WITH NEUROSES (SYMPTOMATIC OR ETIOLOGICAL)

A	Gastro-Intestinal Neurosis	23	
	(a) Mucous Colitis	4	
			27
B	Malnutrition		26
C	Cardiac Disorders		
	(a) Hypertension	10	
	(b) Paroxysmal Tachycardia	3	
	(c) Effort Syndrome	2	
	(d) Cardiac Insufficiency	2	
	(e) Palpitation	2	
			19
D	Chronic Arthritis		7
E	Secondary Anemia		6
F	Pelvic Disorders		5
G	Hyperthyroidism		4
H	Menopause		4
I	Angio-neurotic Edema		2
J	Hysterical Paralysis		2
K	Spasmodic Torticollis		1
	Total		103

The numbers are again too small to be of statistical value, but we observe that two systems

of the body which are most intimately associated with the nervous system, the digestive and the circulatory, are well represented. Gastrointestinal disturbances may, of course, be purely organic, but are very frequently of psychic origin and the first group has been confined to the latter type of case. Under the cardiac disorders we find two that are definitely organic, cardiac insufficiency and hypertension (although the latter frequently has a functional element), and two that are probably largely functional, effort syndrome and palpitation. In the remaining type, paroxysmal tachycardia, it is often difficult to determine whether it is due to some organic pathology or is purely functional.

We also observe that general systemic difficulties affecting the body as a whole, such as malnutrition and anemia, are associated with psychoneuroses. Arthritis is often a precursor of a neurosis because of the pain, the limitation of activity and the fear of invalidism. Pelvic disorders are classically prone to cause nervous upsets and should always be considered as a possible factor in the neurotic female. Hyperthyroidism and the menopause might well be grouped together as disturbances of the glands of internal secretion which are particularly apt to affect the nervous stability of the patient. Finally, the three remaining groups are examples of physical phenomena that are symptomatic of the psychoneurotic state, but are not always easy to differentiate from true organic pathology.

CONCLUSIONS

In closing, there are three points that would seem to deserve special emphasis:

(1) In order to treat successfully a case of psychoneurosis, one must investigate carefully the etiological factors of the individual case.

(2) In a large proportion of cases of psychoneurosis, some physical abnormality will be found to have contributed to the production of the neurosis.

(3) The family practitioner is the individual best fitted to determine the interrelation of the functional and organic elements of any such case and to treat the two simultaneously.

DISCUSSION

DR. HARRISON A. CHASE, Brockton: Dr. Campbell has asked a question that seems to me quite important, that is, what does the general practitioner do with the neurotic wrecks that arrive in almost hopeless condition? I think I can tell him somewhat, being a general practitioner. I think the first attitude on our part is somewhat one of disgust at the apparent foolishness of the patient's symptoms; secondly, disgust at our own inability to determine the cause of them, and again the sense of irritation at not being able to help. Lack of time is a very important thing with the general practitioner.

I have tried in the past year or two to correct this to some extent and I find the lack of time and the failure to be paid for the necessary time, or rather for the time it would take me to do it, have been important preventive factors.

I think there is repression in asking certain questions we really ought to ask. I admit I can't do it gracefully, or I think I can't, anyway. Also something was spoken of in regard to asking patients about their sex life when you know them well and your wife knows them well. I think that is a very great factor.

All in all I am a little discouraged about the general practitioner's ability to carry out a proper treatment. I have found a little encouragement and success, and that is with children. It seems as though I could get ahead a little bit with children, particularly, I think, in regard to some physical handicaps, some perhaps that Dr. Reynolds has not mentioned; the small child who is very slender, who is obviously far below par. That child is very likely to get into trouble from having been ridiculed and from a general feeling of inferiority. Then there is the awkward boy, the spindle-shanked boy, the overfat boy, the overlarge boy, who has not a corresponding amount of intelligence. All of those are likely to be ridiculed, and those are cases where the general practitioner can, without a great deal of psychological knowledge, ask a few questions and do a great deal to straighten out the affair. It is really the reaction of the world, of society, to these handicaps and conditions in the individual that does the harm. If they were left alone, in the majority of cases many would get along all right. The trouble seems to me to be in the way that they are handled.

For instance, there are lameness, and paralysis, and certain definite neurological handicaps that come into the question, the result of encephalitis. I do not know how often that leaves after-effects, but it may leave after-effects much more often than we appreciate; certain peculiarities of action may come from this, and a great deal can be done to protect that child through the various hardships he has to endure during the after-effects.

Then there are certain birth deficiencies, partial deafness as the child enters school and poor vision; frequently those things are not recognized by the family doctor, and, if they are recognized, the hardship of the child is certainly very much less.

I think Dr. Reynolds did not say much about puberty. It has seemed to me that was a time particularly when the child was very susceptible. The obvious changes in character that occur at that time all show a certain great emotional upset and inbalance of endocrine origin. No endocrine therapy with which I am familiar can help them at that time, and there should be great care in the advice given to mothers and fathers as to methods employed in dealing with the awkward and peculiar symptoms that arise. Prob-

ably these attitudes are only temporary and if the parent leaves them alone and lets them work out their own salvation, the chances are very much better.

I think infections are very important and especially the problems of convalescence. We rarely care for them as adequately as we should. Any tendency to nervous symptoms that exist in this type of case is very likely to appear at that time.

To what degree these physical handicaps and diseases are responsible in bringing about the neuroses I do not know; whether they are the sole cause, the greater cause, or a lesser cause in an unbalanced personality. I am inclined to think the patient is not going to succumb if his personality is balanced. I think the break dates back to some early imperfection.

DR. W. B. SWIFT, Boston: I also have listened with a great deal of attention to the etiology of the psychoneuroses and it seems to me, while I have not had time to prepare this, nor time now to present the matter exhaustively, I can offer something in summarized form, hoping you will think it over and imagine the rest.

The physical nature has been blamed and we all know how the subconscious has played its part. We realize how the glands act, but it seems to me that all through these discussions one large localization has been neglected, in fact, I have not heard any of these gentlemen mention the sensorium, and it seems to me, *there* is the place where the etiology of many of these external phenomena can be found. If you will look through the other parts of medicine, you will see parallelisms to this.

We all know that exaggerated reflexes come from lack of function in the ascending frontal convolution, and in my little field of speech there is a beautiful illustration of the externalization of lack of function in the sensorium; for example, speech defects in general can be classified as to form, sound, and content, all sensorial lack.

The form is externalized through the ascending parietal convolution, the kinesthetic level, sound takes its model from the auditory areas, and the content is largely dominated by what has been put into the cuneal area; so there, we have a beautiful parallel of localizations in the sensorium which externalize themselves in different forms of speech disorders.

I hope the individuals who are speaking of the psychoneuroses will not make the mistake that the individuals have done who have engineered the movement for mental hygiene. It seems to me that this has been misnamed.

"Mental Hygiene" is a misnomer. "Mental hygiene" is not really "mental hygiene"; it is psychiatric prophylaxis, and the "psychoneuroses" are they not instead sensorial asthenias? Thank you.

The following officers were elected to serve for the ensuing year in the Section of Medicine:

Chairman—Cadis Phipps, Brookline.
Secretary—F. Dennette Adams, Boston.

CHAIRMAN PALFREY: I will entertain a motion for a vote of thanks to all who have contributed to this program and I suggest that it be made a rising vote which will automatically adjourn the meeting.

The motion was regularly made and seconded, was put to a vote and was carried. The members arose and applauded. The meeting adjourned at one o'clock.

GASTROSTOMY AS A PALLIATIVE MEASURE*

BY ERNEST M. DALAND, M.D.,† AND ALFONSO A. PALERMO, M.D.†

PALLIATIVE operations play an important rôle in a hospital where many advanced cancer patients are seen. Gastrostomy, an operation done for the purpose of feeding the patient through an artificial opening, is one of these. During the past two and three-fourths years, there have been ten patients on whom gastrostomy has been performed at the Pondville Hospital. In addition, ten patients have been admitted on whom this operation had been done previous to admission.

It has been our experience that when the purpose and details of the operation and the mechanism of feeding are explained to the patient, the operation is rarely refused. Gradually these patients have come to the point where they realize that they are starving to death, and anything that offers a postponement of that event is readily accepted. Operation was refused by three patients.

The indications for gastrostomy are the presence of obstructing lesions of the esophagus or cardiac orifice, malignancies of the larynx involving the upper end of the esophagus, and malignancies in the mouth or pharynx interfering with swallowing. The time to operate is when the patient is unable to take a proper amount of nourishment by mouth to maintain his weight and strength. There is no reason for operating if the same amount of concentrated, liquid food can be given by mouth as would be given through the gastrostomy opening. If operation is delayed until the patient is dehydrated and weak from lack of food, the risk of the operation is increased and the possibility of relief is lessened.

Gastrostomies in our series have been limited to two types, the Witzel operation, where a tube is sewed into the stomach, and the Ssbanajew-Franck operation, where a valve-like arrangement serves to close the opening in the stomach, thus allowing the passing of a catheter at each feeding. Where there is a possibility of the patient living for some time and being able to feed himself, the second operation is to be preferred, but it is not feasible to use it if the stomach is very small or fixed lower down than its normal position in the abdomen.

In the Witzel method, a left upper rectus incision is used. A point midway between the two curvatures and three to four inches from the pylorus is located. An incision is made through all the layers of the stomach wall, large enough to admit a 28 (F.) catheter. A purse string catgut suture is taken about the catheter and the catheter is also sewed directly to the stomach wall. The catheter is then laid along the stomach wall toward the cardia and folds of the stomach are closed over it with interrupted catgut sutures. The stomach is anchored to the peritoneum and the catheter brought out through the wound.

A similar left upper rectus incision is made in the Ssbanajew-Franck method. A second incision is made parallel to and just above the costal border. A portion of the anterior wall of the stomach about three inches long is drawn out from the first wound and pulled through a tunnel (Figure I) outside the peritoneum but

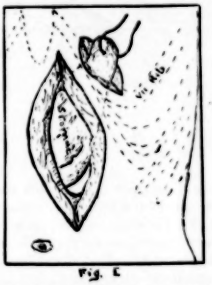

FIGURE I. The Ssbanajew-Franck gastrostomy, showing the stomach pulled under the rectus muscle.

under the muscle and fascia (Figure III) until about one-half inch of the stomach protrudes from the wound above the costal border (Figure II). The stomach is sutured to the peritoneum

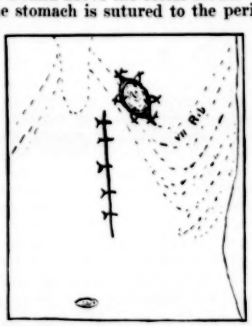

FIGURE II. The wound closed. Note the stomach protruding and sutured to the skin.

in the first wound and the wound is completely closed. The projecting stomach is sutured to

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†Daland—Chief of Staff, Pondville Hospital. Palermo—Formerly, Resident Surgeon, Pondville Hospital. For records and addresses of authors see "This Week's Issue", page 336.

the skin of the other wound. A few hours later, this portion of the stomach is opened and feeding started. The rectus muscle and the costal border act as a valve to prevent leakage. The catheter is passed each time the patient is fed and after a few days may be passed by the patient himself.

Obviously the Ssbanajew-Franck type of gastrostomy is to be preferred whenever it can be done. The reasons for this are: (1) The management of the patient is simplified in that the patient feeds himself. This can be done in the upright position as the valve-like action of the

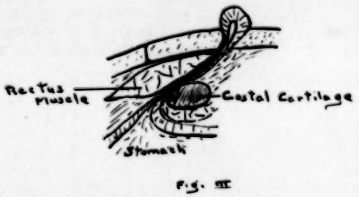

Fig. III

FIGURE III. Showing the mechanism of the valve in the Ssbanajew-Franck operation.

rectus muscle against the rib prevents any loss of gastric content when the catheter is withdrawn. (2) The gastrostomy is cleaner in that the constant irritation of a permanent catheter is eliminated. (3) The dressing is simplified in that a small bit of gauze with a little vaseline on it covering the protruding nub of stomach is all that is required in place of a binder to hold the permanent catheter against the abdominal wall.

The diet given these patients consists of a formula made up of six ounces of heavy cream (40%), two eggs, 6 drachms of milk sugar and milk to make 50 ounces. This is divided into five feedings. The formula gives 1730 calories. A total of 2500 calories is given in twenty-four hours, the remainder being made up by soups (such as asparagus, spinach, chicken, etc.) thin cereals, orange juice, and mashed bananas, alternating with formula feedings. Water may be given between feedings. (They are fed every two hours during the day and twice at night during the first two weeks, then every three hours as desired.) The patients are weighed each week, and if they do not show a gain in weight, the number of calories is increased to 3000. After the first two weeks, they are allowed to taste their food and take a few swallows if they wish before receiving it through the gastrostomy.

After two to three weeks, the edema in the region of the lesion often subsides enough to enable the patient to take practically all nourishment by mouth, until such time as the edema recurs.

In reviewing the twenty cases of gastrostomy, it was found that all those operated upon before admission had the Witzel type. Of those done at Pondville, seven were done by the Witzel technique and three by the Ssbanajew-Franck. Nineteen of the patients were men and one was a woman. The ages ranged from 44 to 82—an average of 65.6. Seven of the cases had the lesion at the upper third, seven at the middle, and six at the lower third of the esophagus. Three of the cases classed as having the lesion in the "upper third" were tongue cases; two of the cases classed as "lower third" were carcinoma of the cardia of the stomach. The duration of symptoms before consulting a doctor varied from five weeks to one year—an average of 3.2 months. The duration of symptoms before gastrostomy was performed varied from five weeks to eighteen months—an average of 5.6 months. The duration of life from onset of first symptom ranged from two and one-half months to twenty-six months—an average of 8.3 months. The duration of life following operation varied from ten days to eight months—an average of 3 months.

In the small series of gastrostomies done at Pondville, the postoperative mortality may practically be rated at nil. One patient died ten days after operation. This was an advanced case of carcinoma of the tongue where the operation was done as a last resort in that a nasal tube could not be passed. Local anesthesia, the usual 1% novocain, was used.

Summary:

1. Twenty cases of gastrostomy were reviewed at the Pondville Hospital.
   (a) Ten had the operation performed before admission.
   (b) Ten were operated upon at Pondville.
2. Two types of operation were used.
   (a) The Witzel which requires a permanent catheter.
   (b) The Ssbanajew-Franck which permits a removable catheter.
3. The operative mortality of the ten cases operated upon at Pondville was practically negligible.

ANEMIA IN INFANTS AND CHILDREN*

BY JAMES M. BATY, M.D.†

THE blood and the changes in the blood brought about by disease as it affects the hematopoietic system, either primarily or secondarily, vary considerably at different age levels. Normally there is a wide variation, coincident with a continuous change, in the blood picture during infancy and to a lesser degree during childhood. The hematopoietic system is more unstable at this period than in adult life and the reactions to comparable stimuli tend to be more bizarre. An understanding of anemia as it occurs in infancy and childhood is dependent primarily upon the appreciation of this fact.

Age:	At birth	2 days	5 days	10th day	2 wks.	6 mos.	1 yr.	2 yrs.	4 yrs.	8-12 yrs.
Rbc.	6,220,000	5,800,000	5,800,000	5,500,000	5,300,000	4,900,000	5,000,000	5,000,000	5,000,000	5,000,000
Hgb.	130%	132%	120%	110%	100%	80%	80%	85%	90%	90%
Wbc.	15,000	23,000	11,000	11,000	11,000	10,000	10,000	9,000	8,000	8,000
Plat.	400,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000
PMN.	45	55	40	35	35	40	40	40	50	60
Eosino. and Baso.	3	5	5	4	4	3	2	2	2	2
Mono.	12	15	12	10	6	6	5	8	8	8
Lympho.	30	20	40	50	55	51	53	50	40	30
Premat. Wbc.	10	5	3	1	0	0	0	0	0	0
Nucl. Rbc.	++	+	+	0	0	0	0	0	0	0
Retic.	1%	3%	1.5%	1%	0.5%	0.5%	1%	1%	1%	1%

FIGURE 1. Average of Normal Blood Values at Different Age Levels.

Figure 1 gives the average values for the blood in normal infants and children as compiled from various reports and our own data. Attention is called particularly to the high erythrocyte and hemoglobin values and the diminishing number of immature forms during the first two weeks of life.

During the past 2½ years, investigation of a large group of patients with abnormal blood findings has been carried out by the hematology laboratory of the Infants' and Children's Hospitals. As it became necessary to place the various cases into groups, and since it was not felt that the classifications in vogue were particularly applicable to anemia as it occurs in infancy, the scheme shown in figure 2 was gradually developed. It is not offered as an inelastic classification of anemia, but as a practical working basis most useful in diagnosis and treatment. It will be noticed that von Jaksch's anemia and pernicious anemia are not included. For the sake of clarity and to determine so far as possible the primary etiological factors in the production of anemia, it seems advisable, as advocated by many previous authors, to discard the term von Jaksch's anemia entirely. Pernicious anemia rarely, if ever, occurs among the age groups under consideration. An analysis of the 400 cases studied shows the following distribution:

Group A	52 cases	13%	of total
" B	17 "	4%	" "
" C	16 "	4%	" "
" D	315 "	79%	" "

Anemia of Prematurity	64
Congenital Anemia	28
Dietary Anemia	30
Anemia Associated with Infection	193
Total	400

The time allotted does not allow consideration of the first three groups which are relatively uncommon. However, it should be pointed out that splenectomy is a valuable therapeutic procedure in well-established cases of primary thrombopenic purpura and Banti's disease. It is of questionable value in splenomegaly with

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Presented before the New England Pediatric Society, May 23, 1930.

†Baty—Assistant in Pediatrics, Harvard Medical School. For record and address of author see "This Week's Issue", page 336.

gastric hemorrhage and relieves mechanical symptoms in Gaucher's disease.

ANEMIA OF PREMATURITY*

At birth the blood of infants born prematurely is comparable to that of full term babies. In

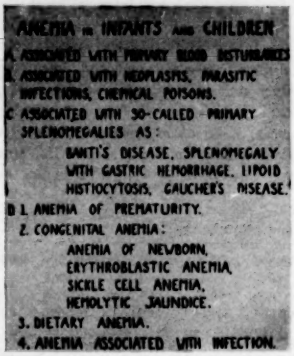
ANEMIA IN INFANTS AND CHILDREN
A. ASSOCIATED WITH PRIMARY BLOOD DISTURBANCES
B. ASSOCIATED WITH NEOPLASMS, PARASITIC INFECTIONS, CHEMICAL POISONS.
C. ASSOCIATED WITH SO-CALLED PRIMARY SPLENOMEGALIES AS:
GANTI'S DISEASE, SPLENOMEGALY WITH GASTRIC HEMORRHAGE, LIPOID HISTIOCYTOSIS, GAUCHER'S DISEASE.
D 1. ANEMIA OF PREMATURITY.
2. CONGENITAL ANEMIA:
ANEMIA OF NEWBORN,
ERYTHROBLASTIC ANEMIA,
SICKLE CELL ANEMIA,
HEMOLYTIC JAUNDICE.
3. DIETARY ANEMIA.
4. ANEMIA ASSOCIATED WITH INFECTION.

FIGURE 2.

premature infants there is a rapid fall in the number of erythrocytes and in the hemoglobin percentage during the first few weeks of life, the lowest values being reached by the end of the third month. The degree of the ensuing anemia is inversely proportional to the duration of pregnancy, the red blood cells commonly numbering 2,500,000 to 3,000,000 per cu. mm. and the hemoglobin 45 to 55 per cent. There is then a gradual increase in the erythrocytes and hemoglobin until at the sixth or seventh month the values are again comparable to those in the full term infant. This physiological change is called the anemia of prematurity. It is evidenced clinically by pallor of the skin and mucous membranes and as a rule is not accompanied by cessation of gain in weight nor of increase in growth. The spleen may or may not be palpable, but never is enlarged greatly. Evidences of increased hemolysis or of loss of blood do not appear. Figure 3 shows the red blood cell counts and hemoglobin percentages of an infant born during the eighth month of gestation, weighing 2 pounds 12 ounces. There were 6,620,000 erythrocytes per cu. mm. and 136 per cent. hemoglobin at birth. At the end of the third month the values were 2,540,000 per cu. mm. and 45 per cent. and at 7 months, 4,920,000 per cu. mm. and 90 per cent. The infant weighed 17 pounds at this time and seemed entirely normal. No unusual therapeutic procedures, such as transfusion or special diet, were instituted to which the rapid blood regeneration might be attributed. One explanation for the development of this physiological anemia is that the storage of iron, which is thought to be accumulated in the liver during the last 3 months of fetal life, is insufficient in the prematurely born infant and becomes exhausted before iron-containing foods are added to the diet. Another is that the premature infant is unable to utilize iron properly. Efforts are being made to prevent the development of this anemia and to hasten blood regeneration by the administration of iron, liver and liver extract and combinations of these substances. No definite benefit has been attained as yet and further investigation is necessary. Repeated transfusion of blood prevents the development of the anemia and may be used in cases of greater severity. Failure to provide an adequate diet to the premature infant at the proper

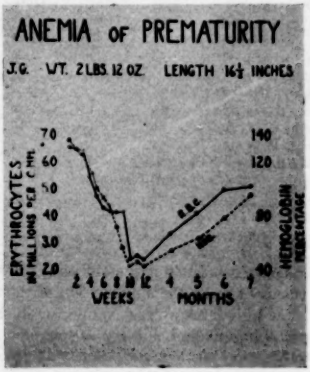

FIGURE 3.

time and the occurrence of infection may prevent the return of the blood to normal and prolong the anemia into the second year of life.

CONGENITAL ANEMIA

Familial hemolytic jaundice is the most widely known of the congenital anemias. The acquired form rarely occurs in children. Familial hemolytic jaundice is characterized by a chronic anemia, acholuric icterus, increased fragility of the erythrocytes and enlargement of the spleen. Intermittent exacerbations occur and a history of familial incidence may be obtained. Splenectomy is followed by improvement or relief of symptoms in the majority of instances although

*A more detailed discussion of the anemias of infancy and childhood is presented in the Oxford Monographs on Diagnosis and Treatment, vol. IX, page 521, Oxford University Press, New York, 1930.

operation is not necessary in the mildest cases.

Sickle-cell anemia is also a familial disease and occurs almost always in people with negro blood. It is characterized by chronic anemia of varying degree, enlargement of the spleen and the formation of peculiar elongated and sickle-shaped red blood cells. The condition may exist in mild form without concomitant symptoms. Removal of the spleen apparently is of benefit in the more severe cases.

Anemia of the new-born is a very rare condition of unknown etiology in which severe anemia is present at birth or develops shortly afterwards. It follows a self-limited course and therapeutic indications are dependent on the condition of the patient and the severity of the anemia. One or more transfusions of blood produce relief of immediate symptoms and iron may be given in large amounts later.

Erythroblastic anemia is a relatively uncommon condition which has been separated recently from the heterogeneous group of so-called von Jaksch's or splenic anemia. It is characterized by a congenital, familial and racial incidence, being limited to Mediterranean peoples, slowly progressing anemia with large numbers of nucleated erythrocytes in the peripheral blood, enlargement of the spleen, mongoloid facies and distinctive changes in the bones as shown by roentgenological examination. Figure 4 shows infant twins of Greek parentage. They were brought to the hospital at the age of 11 months because of pallor and enlargement of the abdomen for 8 months. They showed severe anemia, many nucleated erythrocytes in the peripheral blood, enlargement of the spleen and typical bone changes. Blood transfusions and large doses of iron and liver produced no lasting benefit and they died at home at the age of 18 months, within a month of each other. They illustrate the facial character common to all of the patients with this disease: high forehead with prominent frontal bosses and malar bones, widely set eyes, puffy lids and epicanthal folds.

Two brothers, ages 8 and 7 years, of Greek parentage are seen in figure 5. Symptoms were first noticed at 3 and 4 years respectively. The spleen was removed in each of these children.

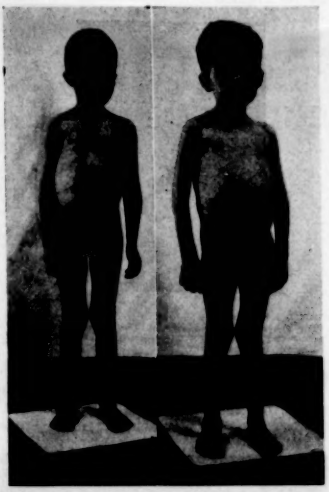

FIGURE 5. Erythroblastic anemia. Attention is called to the similarity in facial appearance of these children and the infant twins shown in Figure 4.

FIGURE 4. Erythroblastic Anemia. Infant twins of 11 months. Characteristic facies, mongoloid in type. Eyes prominent, lids puffy, epicanthal fold present, forehead high with prominent frontal bosses.

The younger died within a few months after operation from thromboses of the mesenteric veins, the older is alive at the age of 11 years. Attention is called to the similarity in facial appearance of these children and the infant twins shown in figure 4. Figure 6 illustrates the characteristic changes in the bones as shown by x-ray examination: widening of the

medullary portion, osteoporosis, prominent trabeculations and extreme thinning of the cortices. The skull (figure 7) shows widening of the

FIGURE 6. Erythroblastic anemia. X-ray of forearm and hand. The characteristic changes in the bones are illustrated: widening of the medullary portion with prominent trabeculations; extreme thinning of cortices.

bones due to increase in the medullary portion and innumerable radiating spicules extending outwards from the thin inner table. The outer table is destroyed beyond identification. Figure 8 shows selected blood counts over a 2½ year period from a patient with erythroblastic anemia. Attention is called to the gradual progression of the anemia, the persistent leucocytosis, the large numbers of nucleated red blood cells before splenectomy and the great increase afterwards. The treatment of this condition is unsatisfactory. Removal of the spleen, x-ray irradiation and large doses of iron, liver and liver extract have been tried without improvement. The disease has been fatal in the majority of instances after a relatively chronic course.

FIGURE 7. Erythroblastic anemia. X-ray of skull. Medullary portion widened; innumerable radiating spicules extend outward from the thin inner table. The changes are striking in the small section of skull in insert.

DIETARY ANEMIA

This term is used to designate the condition variously called nutritional or alimentary anemia, milk or goat's milk anemia. Although dietary factors are undoubtedly of importance in the development of anemia in many cases, uncomplicated dietary anemia is relatively rare. In general there are two important etiological factors in the production of anemia of this type. First a deficiency of one or more components necessary to the well balanced diet, and second, failure on the part of the individual to utilize properly the ingested food. The clinical picture is one of pallor of varying degree, often associated with anorexia, weakness and irritability. The physical state may remain surprisingly good, but in most cases the muscles become flabby eventually and growth is affected. The spleen may or may not be enlarged. The liver and superficial lymph glands often are increased in size. The blood shows an anemia with a low color index. The erythrocytes vary from 1,000,000 to 5,000,000 per cu. mm. being commonly between 3,000,000 and 5,000,000 per cu. mm. The hemoglobin usually is below 60 per cent. and may be as low as 10 per cent. There is no characteristic change in the leucocytes, the total count varying from 4,000 to 20,000 per cu. mm. Immature cells of all types may be present in large numbers. The diagnosis rests chiefly on the exclusion of other factors as primary causes in the development of the anemia in the presence of definite dietary deficiency. The diagnosis is made with difficulty in many cases because of the common association of intercurrent infec-

tions. The prognosis in uncomplicated cases is excellent. The treatment of dietary anemia is concerned primarily with the regulation of the diet and hygienic habits of the patient. Iron increases blood regeneration in the majority of instances and may be administered in any one of several easily obtainable forms. Much larger doses than have been employed customarily are necessary to obtain the maximum effect of iron therapy. We have used the double salt, iron and ammonium citrate. It is readily soluble and may be added directly to the milk. Ill effects have not resulted from its use except for the occasional occurrence of slight diarrhea. Approximately 2 to 4 grams (½ to 1 teaspoonful) are given daily in 2 or 3 doses over a period of about 3 weeks, and smaller amounts should be continued for many weeks to maintain the beneficial effect. Figure 9 shows the rapid response in blood regeneration in a case of dietary anemia following the addition of iron to the diet. In certain cases liver is beneficial. The pulp of 100 grams of liver daily may be used in infants. A greater response in blood regeneration is obtained, in many instances, from diets containing a combination of iron and liver. The use of liver extract in the treatment of secondary anemia is in the experimental stage. Apparently it produces some benefit but is not so efficacious as comparable amounts of liver or of iron. In more severe cases one or more blood transfusions may be necessary. Frequent small transfusions (5 to 10 cc. per pound of body weight) are often more beneficial in restoring the blood to normal than single large transfusions. The most important indication for giving blood is evidence of cardiac embarrassment. Transfusion may be employed also in an effort to lessen the susceptibility of the patient to intercurrent infections or to shorten the period of dietary treatment.

Date	Hgb.	R. B. C. per cu. mm.	W. B. C. per cu. mm.	Nucleated R. B. C. per cu. mm.
12-8-25	30	2,070,000	34,300	13,000
12-9-25	31	2,304,000	61,200	42,000
12-20-25	35	2,304,000	44,100	28,500
1-26-26	33	1,593,000	31,000	15,400
3-11-26	25	2,730,000	11,300	1,300
7-19-26	Splenectomy			
8-23-26	75	3,470,000	25,000	37,200
12-7-26	50	4,300,000	25,000	320,000
2-17-27	51	3,450,000	23,000	51,000
11-20-27	85	3,150,000	16,000	210,000
6-7-28	85	1,847,000	26,600	170,000

FIGURE 8. Blood counts of patient with erythroblastic anemia. Attention is called particularly to the large numbers of nucleated red blood cells before splenectomy and the great increase afterwards.

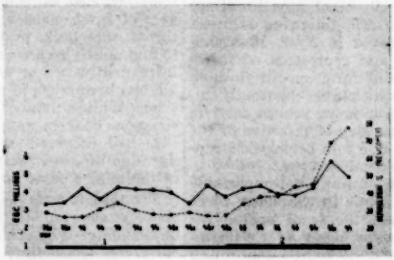

FIGURE 9. L. S. Anemia. Dietary. Solid line, erythrocytes; broken line, hemoglobin. Daily exposures to Alpine lamp or direct sunlight during period 1. Iron and ammonium citrate 4 gm. daily during period 2. Diet constant.

ANEMIA ASSOCIATED WITH INFECTION

The most common etiological factor in the production of anemia in infants and children is infection. The three mechanisms concerned in the production of this form of anemia are: 1. diminished production of erythrocytes, the so-

called toxic suppression of the bone marrow, type: aplastic anemia; 2. increased destruction of circulating erythrocytes with evidences of hemolysis, type: hemolytic anemia; 3. diminished production or increased destruction of blood platelets, type: secondary thrombopenic purpura. It should be borne in mind that there may exist all combinations of the three mechanisms and all degrees of severity. The anemia varies widely in different cases and is of secondary importance in the majority of instances, particularly during the acute stages of the infection. It is obvious that the first therapeutic consideration should be given to the search for and the removal of the primary focus of infection when possible. Transfusion of blood is indicated when severe anemia is present. After the initiating infection has been removed or has subsided, iron and liver therapy, together with transfusion in severe cases, produces a more rapid return to normal hematopoietic activity. This is especially true when there is physiological hypoplasia or inactivity of the bone marrow.

In conclusion, certain features should be emphasized:

1. The hematopoietic system of the infant and, to a lesser degree, of the child, is unstable and may react in a very bizarre manner to stimuli.
2. The normal blood values vary considerably and change rapidly during the first year of life.
3. The widely different prognostic and therapeutic indications in the conditions mentioned demand very careful study leading to accurate diagnosis of the anemias in infancy and childhood.
4. A physiological anemia occurs in prematurely born infants.
5. Splenectomy is of value in well established cases of
   - Primary thrombopenic purpura
   - Banti's disease
   - Splenomegaly with gastric hemorrhage
   - Gaucher's disease
   - Hemolytic jaundice
   - Sickle-cell anemia.
6. The feeding of iron in large doses and of whole liver is a valuable adjunct in the treatment of anemia.
7. Transfusion is necessary only in rare instances.

AN OUTBREAK OF MILK-BORNE SORE THROAT*

BY EDWARD A. LANE, M.D.,† AND GAYLORD W. ANDERSON, M.D.†

OUTBREAKS of septic sore throat spread through the medium of milk are well recognized and frequently reported, but similar outbreaks of a milder streptococcal sore throat are less frequently studied. The following outbreak of the latter type occurred in Ayer, Massachusetts in March, 1930, and represents an infection of a relatively mild form spread through the medium of milk which was apparently infected directly by one or more proven carriers without the intermediate step of infection of the udder of the cow, and due to a hemolytic streptococcus, not of the epidemicus type.

While sore throat is of itself not reportable unless diphtheritic or septic in character, there had, very evidently, been the usual amount for this time of the year in and about Ayer. Beginning Saturday, March 8, 1930 and continuing for four or five days an unusually large number of cases of sore throat came to the attention of the local physicians. The cases were confined to the built-up portion of Ayer and were for the most part on the same milk route. The physicians considered that they were dealing with a milk-borne epidemic of mild septic sore throat.

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CLINICAL PICTURE

The onset was sudden and acute. The symptoms included chills, or chilliness, moderate degree of fever, nausea, headache, backache, sore throat, sore neck, prostration. It was the rule to find multiple cases in the same family and not infrequently two or more of them, occasionally all, had been taken ill at approximately the same time. While a number of the patients were quite sick none of them were seriously so and no fatalities had occurred or were anticipated. The duration of illness was from two or three days in the milder cases up to a week or ten days.

The throats were described by the local physicians as showing diffuse redness with or without exudate. The exudate was of a sticky, mucilaginous character either in spots or as a pseudo membrane. A few of the more acute cases seen by the writers had the appearance of a severe follicular tonsillitis. Aside from the cervical adenitis which appeared to be quite common, the complications were almost nil, being limited to two or three cases of acute otitis media. Many of the cases had of course scarcely had time to develop complications at the time of the investigation.

Throat cultures were obtained during the course of the three day investigation from eighteen cases of which seven were found to be posi-

tive for hemolytic streptococci. Dr. E. S. Robinson of this Department, who examined some of these cultures, states that they do not appear to be of the epidemicus type.

DISTRIBUTION OF CASES

A total of 178 cases of septic sore throat were reported by physicians. Although the cases had started to come to their attention about a week prior to the investigation, their nature and cause had not at first been suspected. Individual epidemiological case records were obtained on every case.

Distribution of investigated cases by date of onset:

Dates of Onset	Cases	Dates of Onset	Cases
Feb. 25	2	Mar. 9	27
26	1	10	31
27	3	11	37
28	2	12	17
Mar. 1	1	13	15
2	0	14	9
3	0	15	6
4	5	16	0
5	0	17	0
6	1	Unknown	1
7	1		
8	19	Total	178

DISTRIBUTION BY LOCATION

The cases were all confined to the built-up portion of the town but there was no localization within this area. All social strata were involved.

Occurrence by sex and age:

Age	M.	F.	Total
0-4	6	4	10
5-9	6	16	22
10-14	9	7	16
15-19	9	14	23
20-29	11	9	20
30-39	14	13	27
40-49	9	15	24
50-59	8	4	12
60+	3	11	14
Unknown adults	5	5	10
Total	80	98	178

The excess of females over males in the age groups above 60 is due to the fact that the infected milk supply was used at the Old Ladies' Home where six cases occurred.

Numbers of cases by families:

	Families
1 case	23
2 cases	17
3 "	12
4 "	10
5 "	3
6 "	0
7 "	2
8 "	2

RELATION TO MILK SUPPLY

The case investigation was in complete accord with the preliminary inquiry which had indicated that the outbreak was connected with a particular raw milk supply. The distribution of cases and of affected families by milk supply was as follows (those using milk from more than one source are credited in both dairies):

Dairy	Cases	Families
A	6	3
B	9	3
C	6	2
D	3	2
E	10	5
F	0	0
G	4	1
H	3	1
I	164	62

While information relative to the use of milk by those members of the family who were not infected is incomplete, all except 13 of the investigated cases had a history of having used the milk in question (I) to a greater or less extent. Of 331 individuals in the 68 families included in the investigation, 170* were infected, giving a minimum attack rate of 51%. Of the 69 families affected, 62 (90%) had used milk from the I dairy.

Prior to the outbreak only raw milk had been sold in Ayer. The supply had been furnished by nine dealers who each made daily delivery of approximately the following amounts:

SOLD IN AYER

Dealer	Families	Wholesale	Quarts	Cases per 100 Quarts
A	72	7	240	2.5
B	140	0	200	4.5
C	63	0	85	7.1
D	110	0	166	1.8
E	105	0	200	5.0
F	28	0	70	0.0
G	3	0	3	1.3
H	10	4	111	3.7
I	170	0	300	54.7
Total	701	11	1375	12.9†

PREVIOUS CONTACT

The number of patients giving a history of contact with a previous case within or without the family varying from 24 hours up to four days, is 67, leaving 111 definitely primary cases.

Of the 13 cases in which no history of consumption of the infected milk could be elicited, four were primary cases with onset four days or more prior to the outbreak and five were contacts with those cases, leaving but four cases (all in one family) occurring during the outbreak, independently of the infected milk supply or contact.

SITUATION AT THE "I" DAIRY FARM

The infected milk supply came from a dairy a short distance out of Ayer. The dairy herd consisted of 22 cows. The residents on the farm included the proprietor, his wife and a son. The father and son did all the milking and a hired hand attended solely to the bottling with a hand

*Hotel with 8 cases not included because population unknown.
†Weighted average.

bottling machine. Capping was done by hand.* The proprietor's wife assisted only to the extent of washing the strainers, which was the only dairy work done in the house. A cursory examination of the barn and milk room indicated that the equipment and methods were far from satisfactory.

The cows were examined by a veterinarian and found to present no evidence of infection. Milk samples taken from the cows were all found to be negative for hemolytic streptococci on examination in the Department laboratory.

No butter or cream were sold. The daily output of milk was supplemented regularly by 40 quarts from each of two nearby sources and on occasions (two or three times a week) from one or other of three other dairies. No milk was sold to any of the three drug stores in town or through other stores.

With the two regular subsidiary sources of supply nothing could be found wrong except for the presence on one of the farms of a cow with a "bad" quarter, the milk from which showed no streptococci. This dairy ran a milk route in a neighboring town on which no cases of illness occurred. In the other instance also no illness had been associated with that portion of the milk not sold to the "I" dairy.

Of the three occasional subsidiary sources of supply, the milk from one was pasteurized, that from another had been sold elsewhere without causing illness, while that from the third had not been procured until after the onset of the epidemic. Milk from the various sources was mixed.

The medical history of the individuals connected with the suspected milk supply was somewhat contradictory and unsatisfactory. All three of the residents of the dairy farm in question denied any recent illness. Examination of the son's throat, however, gave quite definite evidence of a subsiding angina, while throat cultures from both father and son were consistently positive for hemolytic streptococci. The hired hand who had worked on the farm for the previous nine months also denied having had a sore throat, although his sister-in-law, with whom he lived, is said originally to have admitted that such had been the case. When examined at the time of the investigation his throat appeared normal and cultures taken at this and subsequent times were negative for hemolytic streptococci. It had been felt by others during the preliminary inquiry that this man had infected the milk supply during the process of bottling. By the time of the investigation, however, which was commenced about a week subsequent to the onset of the epidemic, the evidence in his case was all negative, with the possibility that he might have been a factor in the infection of the milk and have cleared up prior to our examination. On the other hand, there seems to be little doubt that the son and possibly the father also, if they were not the sole source of infection of the milk, were at least co-infectors with the hired man.

*The danger of hand capping was recently illustrated by a typhoid outbreak described by Hassler in the *American Journal of Public Health*, Vol. 20, 137, 1930.

IMMEDIATE CONTROL MEASURES

As the hired man who had been thought to be the source of infection had stopped work shortly after the onset of the epidemic, it had not been felt that any special control measures were called for. It did not appear, however, that the milk supply in question could be given a clean bill of health beyond a question of doubt on the strength of the limited evidence that had been collected up to that time, and it was, therefore, recommended that this particular supply be pasteurized or stopped, pending the completion of the investigation. This recommendation was complied with and the milk was sold only after it had been pasteurized and bottled in a neighboring town.

As a permanent result of the outbreak, the local board of health has ordered* that all milk sold in Ayer after October first next shall be either pasteurized or of certified grade.

Cultures from the throat of the father showed hemolytic streptococci for several days, but the son continued positive for several weeks, at the end of which time certain tonsillar remnants were removed, resulting in prompt disappearance of the carrier condition.

SUMMARY

1. An explosive outbreak of sore throat numbering 178 cases occurred in a small Massachusetts community of less than 3,000 population in March, 1930.

2. The causative organism has not as yet been identified beyond the fact that it was a hemolytic streptococcus not typical of the epidemicus variety.

3. The vehicle of infection was raw milk. This was suggested by the nature of the illness and corroborated by finding that 92% of the cases used the same milk supply.

4. The source of infection was very evidently one or more of the workers on the dairy farm who either directly infected the milk through hand capping or milking, or transmitted to one of the cows a transient udder infection which had cleared up before the investigation. He-

*The wording of the regulations in connection herewith, which were passed by the Ayer Board of Health, are as follows:

"*Regulation 14:* On and after October 1, 1930 no person shall sell or offer for sale in the town of Ayer any raw milk or cream unless such milk or cream is certified as provided in Sections 20 to 25 inclusive of Chapter 180 of the General Laws as amended by Chapter 252 of the Acts of 1923.

"*Regulation 15:* On and after October 1, 1930 no person shall sell or offer for sale in the town of Ayer any milk or cream not conforming to the requirements of Regulation 14 unless such milk or cream is pasteurized as defined in Section 1 of Chapter 94 of the General Laws.

"This regulation shall not apply to milk or cream delivered or intended to be delivered to an establishment for the purpose of being pasteurized."

molytic streptococci were obtained from the throats or two of the milk handlers and from patients.

The assistance of Drs. O. A. Dudley, W. W. Knowlton, C. B. Mack and C. S. Stirrett of this Department, of Mr. E. S. Barry, Clerk of the local board of health, and of the local boy scouts is gratefully acknowledged.

THE COMPARATIVE EFFECT OF DIFFERENT IODINE PREPARATIONS IN THE PREOPERATIVE TREATMENT OF THYROTOXICOSIS*

BY MARSHALL N. FULTON, M.D.,† AND HOWARD L. ALT, M.D.†

THE administration of iodine to bring about a temporary remission in thyrotoxicosis has been limited largely to the use of Lugol's solution. Plummer[1], apparently, chose this preparation because it contains a large amount of iodine loosely combined and readily assimilable. Before the publication of Plummer's observations Loewy and Zondek[2] noted that potassium iodide alone would reduce an elevated metabolism and improve the subjective condition of patients with exophthalmic goiter. Boothby in 1924[3] wrote, "We have had but little experience with the use of other iodine preparations (than Lugol's solution); however, it is probable that they would be equally efficacious if the dosage were based on equivalent amounts of iodine." Fitzgerald in 1926[4] compared the effectiveness of Lugol's solution and hydriodic acid containing resublimed iodine. He found that by giving 15 patients with thyrotoxicosis nearly four times as much iodine in the form of hydriodic acid as he gave 25 others in the form of Lugol's solution, there occurred practically the same diminution in the metabolic rate in the two groups and in the same length of time. He does not report whether equivalent amounts of iodine given in these two forms show the same effect. Rabinowitch[5] recently has reported 12 cases treated with a substance called "Vitiodum"—a mixture of vitamines A and D concentrated from cod liver oil incorporated with iodized jecoleic acid. His studies showed that this substance brought about by itself a more effective reduction in the basal metabolic rate than Lugol's solution and in two cases produced a further lowering in the metabolism after Lugol's solution had been given over a period of 25 to 45 days.

To collect some further data on this subject we have treated forty-two patients suffering from thyrotoxicosis either with Lugol's solution, sajodin, or saturated solution of potassium iodide. Fourteen of these received the drugs in doses containing approximately 120 milligrams of iodine daily. Eight others received this amount daily following a single large initial dose, and the remainder were given varying amounts of the three drugs. Judging from the drop in the basal metabolic rate and the time in which it occurred, the three substances appear about equally efficacious regardless of the dosage. Whereas the average drop in metabolism in the Lugol's and potassium iodide groups was 35 and 36 points, respectively, and that in the sajodin group 24, the drop occurred on the average in 11 days in the first two groups and 8 days in the third, so that the average drop per day was essentially the same in each group.

Sajodin is an organic iodine compound, calcium iodobehenate, Ca $(C_{21}H_{42}ICOO)_2$. It is a white, tasteless powder and can be given in adequate doses in pill or capsule form without producing the disagreeable taste and nausea commonly complained of by patients taking Lugol's solution. As an iodine derivative of a fatty acid it is known to be held, in part, by "the fat depots of the body and gradually decomposed with the liberation of iodides. The maximum excretion takes place after ten hours; the iodide reaction disappears from the urine after 84 hours."[6] It contains approximately 23.5% of iodine so that the standard dose of 0.5 gm. is roughly equivalent to 1 cc. of Lugol's solution (an aqueous solution of 5% iodine in 10% potassium iodide yielding 12.6% of free iodine), or to 0.165 gm. (about 2.5 minims) of saturated solution of potassium iodide (76.3% free iodine). In other words, 0.5 gm. of sajodin, 1 cc. of Lugol's solution and 0.165 gm. of potassium iodide each contains approximately 120 milligrams of iodine. This dose is comparable to that usually administered in the preoperative treatment of thyrotoxicosis. Thompson, Brailey, and Thompson[7] have shown that about 1/20 of this amount of iodine is equally effective in producing a maximum reduction in the basal metabolism in patients at rest in bed in a hospital, a fact which indicates that the dosage generally used is much larger than is actually necessary.

METHOD

This study was made on 42 bed patients, all treated at the Peter Bent Brigham Hospital under identical conditions. The usual routine was to start iodine as soon as the diagnosis was established and the course of treatment, including operation, was agreed upon. For economic reasons it was not feasible to keep the patients at rest in bed until their metabolism had reached a resting level before starting iodine. In view of this, we realize that the fall in metabolism

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cannot be attributed to iodine alone. So far as could be ascertained, none of the patients had had iodine immediately previous to entry. The drug was started, as a rule, on the third or fourth day after admission and continued until the time of operation, the basal metabolism being determined every second or third day during this time. In most instances the full daily dose was all given at one time. It appeared to make no difference whether the drug was administered this way rather than in divided doses.

RESULTS

In Table I are shown the figures for the 15 patients receiving Lugol's solution. The dose of 171 milligrams of iodine represents ten drops given three times a day; that of 126 milligrams one cc. given in one dose; and that of 85 milligrams five drops three times a day. It will be seen that the fall in metabolism varies between 17 and 62 points, occurring in anywhere from 2 to 28 days, with an average drop of 35 points in 11 days, or 3.2 points a day. Table II shows figures similarly arranged for the 11 patients receiving sajodin. Here the fall in metabolism averaged only 24 points, but occurred in a shorter period of time, so that the fall per day was essentially the same as with the patients treated with Lugol's solution.

In groups of this size large variations will considerably affect the average, but we feel that the figures give a satisfactory indication of the comparative merits of the two preparations. Table III shows the same degree of response in the 16 patients receiving saturated solution of potassium iodide. Here the daily dosage of iodine in the first seven instances was considerably larger than in either of the other two groups. The last nine patients were given an initial large dose of 511 milligrams of iodine for the purpose of another study, following which they received 125 milligrams of iodine daily, the same amount as those receiving 1 cc. of Lugol's solution of 0.5 gm. of sajodin. The fall in metabolism for the whole group receiving potassium iodide averages 3.3 points daily, or practically the same as in the other two groups.

TABLE I

FIFTEEN PATIENTS RECEIVING LUGOL'S SOLUTION

(a) Daily dose of iodine in mgm.	(b) Last B. M. R. before iodine	(c) Lowest B. M. R. reached	(d) Drop in B. M. R.	(e) No. days between (b) and (c)	(f) Drop in B. M. R. per day
171	+49	+15	34	9	3.8
171	+50	+16	34	28	1.2
171	+58	+4	54	17	3.2
171	+85	+40	45	6	7.5
126	+35	+18	17	7	2.4
126	+62	+11	51	6	8.5
126	+31	+13	18	2	9.0
126	+41	+8	33	8	4.1
126	+49	+31	18	4	4.5
85	+41	+10	31	21	1.5
85	+42	+20	22	9	2.4
85	+70	+8	62	16	3.8
85	+63	+19	44	9	4.9
85	+44	+16	28	10	2.8
85	+60	+23	37	7	5.3
		Average	35	11	3.2

TABLE II

ELEVEN PATIENTS RECEIVING SAJODIN

(a) Daily dose of iodine in mgm.	(b) Last B. M. R. before iodine	(c) Lowest B. M. R. reached	(d) Drop in B. M. R.	(e) No. days between (b) and (c)	(f) Drop in B. M. R. per day
235	+44	+22	22	8	2.7
235	+45	+19	26	12	2.2
117	+58	+30	28	3	9.3
117	+62	+32	30	7	4.3
117	+65	+40	25	7	3.6
117	+82	+45	37	6	6.2
117	+34	+15	19	8	2.4
117	+30	+25	5	8	0.6
117	+28	+14	14	9	2.7
117	+34	+15	19	8	2.4
117	+53	+12	41	14	2.9
		Average	24	8	3.0

TABLE III

SIXTEEN PATIENTS RECEIVING SATURATED SOLUTION OF POTASSIUM IODIDE

(a) Daily dose of iodine in mgm.	(b) Last B. M. R. before iodine	(c) Lowest B. M. R. reached	(d) Drop in B. M. R.	(e) No. days between (b) and (c)	(f) Drop in B. M. R. per day
1038	+46	+18	28	8	3.5
1038	+28	+10	18	11	1.7
694	+72	+17	55	16	3.4
511	+105	+59	46	14	3.3
511	+27	+10	17	8	2.1
511	+43	+18	25	11	2.3
511	+48	+6	42	13	3.2
	Following an initial single dose of 511 mgm. iodine:				
125	+43	+13	30	9	3.3
125	+29	+3	26	10	2.6
125	+61	+20	41	9	4.6
125	+60	+9	51	16	3.2
125	+85	+30	55	13	4.2
125	+60	+18	42	9	4.6
125	+42	+18	24	9	2.6
125	+30	+1	29	7	4.1
50	+65	+15	50	11	4.5
		Average	36	11	3.3

COMMENT

The figures indicate that these three preparations, regardless of the amount of iodine given within the usual range of therapeutic doses are

equally effective in bringing about a fall in metabolism in thyrotoxicosis. From a clinical standpoint no differences could be detected in the improvement of the patients under the different drugs. With each there was the characteristic subjective improvement and slowing of the cardiac rate. There were no uniform differences in their postoperative courses. The patients taking sajodin had none of the complaints of the bad taste and gastric discomfort not uncommonly complained of by those taking Lugol's solution. Lugol's solution is extremely disagreeable to take, and for this reason we have come to prefer either sajodin or potassium iodide to it so long as these appear to be equally effective. In one instance not included in this series, 0.5 gm. of sajodin daily was ineffectual in lowering the metabolism over a period of six days. The patient was then given Lugol's solution, ten drops three times daily for a number of days, but this was equally without effect on the metabolism.

SUMMARY

Lugol's solution, sajodin, and saturated potassium iodide solution are equally effective in the preoperative treatment of thyrotoxicosis. The amount of iodine given, within the range of the usual therapeutic doses, does not appear to be of any significance. Sajodin brings about slightly less of a drop in the basal metabolic rate than the other two preparations but appears to act more promptly, is more easily given, and has the distinct advantage that it is tasteless and produces none of the disagreeable gastric and taste discomfort that comes with taking Lugol's solution.

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CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

EDITED BY RICHARD C. CABOT, M.D.
F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 16331

AN UNUSUAL COMBINATION OF DYSPNEA, CYANOSIS, CLUBBING OF THE FINGERS, BACK PAIN, PARALYSIS BELOW THE WAIST AND WATER-HAMMER PULSATION OF THE PULMONARY ARTERY

MEDICAL DEPARTMENT

PRESENTATION OF CASE

DR. GILES W. THOMAS*: A married Negro cook sixty-two years old entered the hospital April 29 complaining of pain in the right side of the back of three months' duration.

First admission. He had been in the hospital exactly one year before this admission. At that time he complained of shortness of breath. Eight months before admission he noted that his breath was so short that turning over in bed brought on a paroxysmal attack of dyspnea. He was treated by a doctor with digitalis with some improvement. After a period of rest he tried to go back to work but had to give it up. He weighed about 120 pounds on his first admission. Pupils, right slightly larger than left. (On his second admission the pupils were noted to be equal and regular.) Chest emphysematous; a good many râles at the bases. Heart somewhat enlarged to the left, apex in the sixth space. No murmurs were noted at the time, but later a cardiac consultant found an early diastolic murmur along the left border of the sternum. The patient improved with digitalis and was discharged considerably improved.

There were some interesting X-rays of the lungs at that time. The heart shadow was distinctly enlarged and abnormal in shape. The increase was largely downward and to the left in the region of the ventricle. There was also sharp prominence in the region of the pulmonary conus. Pulsation was visible in this area and apparently systolic. "The shadow is probably due to the pulmonary conus." The aorta was prominent in the region of the knob. The lower portion of both lung fields was less radiant than normal. The hilus shadows were definitely increased and there was thickening and beading of the lung markings. The left upper lobe was unusually bright and in the outer margins of this area the lung markings were indistinct, suggesting pneumothorax. In the oblique view the shadow of the left auricle was prominent. The diaphragm was rather distinct on both sides. Its respiratory movements were limited. Examination showed evidence of hypertrophy of the left side of the heart and dilatation of the pulmonary conus and of the left auricle. The lungs showed rather extensive changes which were largely glandular and peribronchial. "The unusual condition in the left upper lobe may be due to pneumothorax."

Dr. Sprague saw the patient at this first entry. "He does not present the picture of Ayerza's disease, if we confine this to the cyanotic 'black cardiacs'. He has chronic pulmonary disease, emphysema, clubbed fingers, dilated pulmonary conus, cardiosclerosis by electrocardiogram, syphilis and an early diastolic murmur along the left sternal border which probably means aortic regurgitation but may possibly be due to regurgitation through the pulmonary valve. It seems most probable that he has luetic aortitis with coronary disease and perhaps syphilitic involvement of the pulmonary artery. Digitalization and antiluetic therapy (potassium iodide and bismuth) are indicated."

History of interval. After discharge from the hospital he was treated with iodobismuthate of quinine in the Out-Patient Department. He had about thirteen injections in all, and also had an uncertain amount of iodides and mercury pills. After six weeks he took a place as cook and worked eight hours a day all summer. When this job ended he worked in a restaurant until eight weeks before his readmission, when the work gave out. He still felt like working. Five weeks before admission he had a cold with some sputum and cough, raising perhaps one or two ounces of sputum a day. He felt fairly well until three weeks before admission, when he began to have attacks of sharp pain under his ribs posteriorly on the right side. This was aggravated particularly on sudden movements such as twisting of the spine, and radiated to the anterior part of the left chest and up and down the spine on the right side. Three weeks before admission the pain moved up his back to about the middorsal region at about the level of the lower part of the scapula or a little above that.

Second admission. At his second admission he was walking about and seemed fairly comfortable except at times when he had attacks of pain. Physical examination showed a small spare man breathing jerkily, in no great distress. Injection of the sclerae. Old scars on the cornea of the right eye. Lungs emphysematous except the right upper lobe, where the breath sounds were diminished, tactile fremitus being normal. Scattered râles, particularly at the bases. Apex in the sixth space. Sounds regular and slow. A diastolic murmur in the left border of the sternum in the fourth and fifth spaces, also faintly

*Recently senior interne on the East Medical service.

audible at the apex and base. Blood pressure 135/85. Clubbed fingers, which we noted before, he said he had had all his life. There was some question about irregularity of the prostate, but a genito-urinary consultant said it was normal.

For the first few days in the hospital he was up and about having attacks of severe back pain which required morphia. These attacks came on about noon. He seemed to be fairly free of them the rest of the time. During the attacks there was no tenderness in the spine or chest. This pain seemed to be best relieved by lying on his stomach with one or two pillows under his chest. After he had been in the hospital about a week and a half he became too weak to walk. A neurological consultant found an indefinite sensory level between the sixth and eighth thoracic. This level could not be definitely mapped out. He found a little weakness of both legs, more on the right than on the left, nothing very marked.

On May 16, a little over two weeks after admission, the patient suddenly became much more cyanotic than usual, breathing with considerable difficulty. The blood pressure fell so that at one time it could not be obtained. He pulled through that attack, but was never able to be up and about after that. Two days later he developed complete paralysis below the waist, and the sensory level became more definite. He had very slight flexion in the hips only. He continued to have attacks of pain off and on. Finally he had an attack similar to the other and died.

The laboratory work was not remarkable. He had one positive Wassermann.

X-ray examination. A gastro-intestinal series was negative. A chest plate showed very little if any change in the size and shape of the heart shadow since the last observation. Fluoroscopy showed the same prominence in the region of the pulmonary conus. The process in the lungs was of the same character but definitely more marked. There was a large mass near the lung root that might represent enlarged glands, and also dullness completely obliterating the lung markings in the left lower lobe. The process in the right lung remained about the same. Lung markings were not shown.

He was seen by Dr. Paul White. "Chronic pulmonary disease with pulmonary artery dilatation, clubbing of the fingers and cyanosis. Whether the diastolic murmur along the left sternal border is due to aortic regurgitation or to pulmonic regurgitation is not clear. The relative rarity of the latter and the fact that the murmur is not well heard over the site of the pulmonic artery itself are points against the diagnosis of pulmonic regurgitation, but the chronic pulmonary disease and the fluoroscopic evidence of marked pulsation (water-hammer pulse) in the pulmonic artery and the lung hiluses are in favor of such a diagnosis.

"Lues is present, but whether or not it is the cause of the pulmonary disease or of a possible pulmonic endarteritis (Ayerza's disease) or of aortitis is not clear. Fluoroscopically the aorta does not seem dilated."

Clinical Discussion

Dr. Paul D. White: I saw this patient before he had symptoms of spinal cord compression, but even then the heart findings were obviously much complicated by a combination of circumstances which included evidence of syphilis and the Roentgen ray pulmonary changes that had developed in a year. The most important cardiac evidence was obtained by fluoroscopy, which I should have emphasized much more in my consultation. Fluoroscopy showed a normal pulsation of the aorta and much increased pulsation in the pulmonary artery. When we see a Corrigan pulse in the aorta we find generally aortic regurgitation, but in this case the Corrigan pulsation was obviously in the pulmonary artery. That alone permits at least a tentative diagnosis of pulmonic regurgitation.

There was very little change in the shape and size of the heart itself in the course of the year, indicating that the new lung findings had not been responsible for the heart disease. The added difficulty in cardiovascular diagnosis in this case was the diagnosis of syphilis, which seemed to be justified; naturally syphilis is much more common in the aorta than in the pulmonary artery and so occasioned suspicion of luetic aortitis; this threw unwarranted doubt on the origin of the diastolic murmur.

Clinical Diagnoses (From Hospital Record)

Syphilis.
Syphilitic heart disease.
Chronic bronchopulmonary infection.
Transverse myelitis (luetic ?).

Anatomic Diagnoses

Pulmonary emphysema.
Carcinoma of the left lung with metastases in the pleura, the diaphragm and the spinal canal.
Hypertrophy of the right heart.
Arteriosclerosis of the aorta and the pulmonary artery. (Pulmonic regurgitation.)
Passive congestion of the liver.

Pathologic Discussion

Dr. Tracy B. Mallory: Autopsy showed an extreme degree of pulmonary emphysema, not the type of lungs in which you see huge blebs, but rather the type in which all the alveoli are diffusely dilated. In the cut section the majority of alveoli appear to be two or three millimeters in diameter. That is three to five times the normal size. This condition was very marked

throughout all the lobes of both lungs. I think it probably accounts for the marked clearness of the lung shadows in the upper levels, which at one time made the X-ray men think of pneumothorax.

There was hypertrophy of the right heart. The wall was dilated, perhaps two-thirds as thick as the left ventricle. The aorta showed very slight scarring just above the level of the aortic cusps, but not beyond the degree we often see in senile arteriosclerosis, and there were no very typical scars of luetic aortitis anywhere throughout the aorta. I could not rule syphilis out entirely, but I do not think it was of great importance in the case. The pulmonary artery showed a marked degree of arteriosclerosis quite out of proportion to that seen in the aorta, and was sufficiently dilated to point to a functional pulmonary regurgitation.

The other important finding of the case was a definite tumor about the size of a hen's egg at the base of the left lung, in the lower lobe. There were metastatic areas of tumor on the parietal pleura, also on the surface of the diaphragm. One of these pleural areas was in immediate contact wtih the spinal column. We examined the spinal cord and found the spinous process of the fifth dorsal vertebra involved by tumor and more or less destroyed. There was some projection of the tumor into the spinal canal. There were also three or four extradural tumors lying in the canal at a slightly lower level. They were of sufficient size to compress the cord distinctly, so that the neurological symptoms are adequately accounted for.

One other finding was a fairly marked degree of passive congestion in the liver.

DR. WHITE: Have you any suspicion as to what might have caused the emphysema?

DR. MALLORY: No. I think probably age more than anything else. The theory has been advanced that it is due to loss of elastic tissue in the lung. We have not had any elastic tissue stains yet. Presumably it is similar to the loss of elastic tissue that occurs in the skin in old age, causing wrinkling. In the same way the aorta becomes diffusely dilated.

DR. EDWARD P. RICHARDSON: The clear areas in the chest plate were due to emphysema?

DR. MALLORY: Yes; and the consolidated area at the base was cancer.

LATER NOTE

As it turned out we had here a remarkable instance of *cor pulmonale*—the emphysema heart— with functional pulmonic regurgitation. (In mitral stenosis such a condition gives rise to the so-called Graham Steele murmur.) This heart disease and failure were dependent on chronic pulmonary emphysema of unknown origin. The syphilis and malignancy were incidental,—confusing, but not responsible for the heart disease.

PAUL D. WHITE.

CASE 16332

TUMOR IN THE RIGHT LOWER QUADRANT AND JAUNDICE

SURGICAL DEPARTMENT

PRESENTATION OF CASE

DR. JOHN D. STEWART*: This is the case of an eighty-two year old Civil War veteran who came into the hospital through the Emergency Ward with the complaint of abdominal pain and vomiting.

In the past history the only important notes are that for the past two or three years he had had increasing urinary symptoms, consisting chiefly of urgency and hesitancy, and that about a year before admission signs of cardiac decompensation developed. His doctor digitalized him and kept him on a maintenance dose of digitalis. Aside from this he had been fairly well until two weeks before admission.

At that time the patient and two other members of the family became sick after eating evidently poor fishcakes, for they all vomited and had abdominal pain for about two days. The other members of the family got well, but the patient continued to have abdominal pain and vomiting. The day before admission he had a good bowel movement, and his bowels moved regularly up to admission. The night before admission he ate a hearty dinner. He felt pretty well for about two hours afterwards. Then he was taken suddenly with severe abdominal pain which was constant, more on the right than on the left. Soon he began vomiting and continued to vomit. The doctor gave him morphia which enabled him to sleep that night. Next morning the pain returned, severe as ever, still in the right lower quadrant. The doctor gave him another dose of morphine and sent him in to the Emergency Ward.

On arrival in the Emergency Ward examination showed a fairly well preserved old man somewhat distressed and dazed mentally. The heart was enlarged to percussion. There was a harsh apical systolic murmur. There were frequent extrasystoles. The blood pressure was not elevated. The abdomen was rather generally distended. In the right lower quadrant there was marked tenderness and spasm. An indefinite, soft, easily movable mass could be felt in the right flank just below the level of the umbilicus. The mass was extremely tender and seemed to lie near the abdominal wall. The most striking thing about it was that it could be moved fairly easily. Rectal examination showed that he had a very large prostate.

On admission the temperature was 104°, the leukocyte count 24,000. Inasmuch as he had suprapubic distention he was catheterized and left on constant drainage. The urine obtained by catheterization showed a large number of

*Senior interne on the East Surgical service.

red cells, occasional leukocytes, a trace of albumin and occasional granular casts.

The patient was seen by various members of the surgical staff and it was decided that his condition was too precarious to allow operation. He was sent to the ward and put on a supportive régime of fluids and glucose by elysis. The maintenance dose of digitalis was continued. An abdominal flat plate was taken on the way to the ward and was negative. No abnormal shadows were shown.

After arrival on the ward the condition did not improve. He steadily became worse. On the second day he became definitely jaundiced. The icteric index was found to be 100. His mental condition became more confused and the breathing became labored. He developed muscular twitching of the extremities. He was obviously on the downward path. Blood non-protein nitrogen determination made on the second day after admission showed 30 milligrams per 100 cubic centimeters. On the fourth day it was 83 milligrams per 100 cubic centimeters eight hours before death. There are no other particular points in the progress. Operation was not seriously considered after admission because of the condition. I might say however that the mass felt on admission became less distinct after he was on the ward two days and on the day before death was questionably palpable; on the night before death I could not convince myself that I felt it at all. So we were faced with a problem in diagnosis in a man of eighty-two with feeble myocardium and an obstructing prostate, and with a tender mass in the right lower quadrant, signs of infection, and a dazed mental condition and jaundice developing after admission

A PHYSICIAN: What diagnosis did you make?

DR. STEWART: Dr. Young, who took the most interest, seemed to feel that the most probable diagnosis was movable distended gall bladder, and that in some way that was connected with the obstructive jaundice. We at first thought the patient had uremia and thought he was probably dying in terminal nephritis. The blood chemistry ruled that out.

DR. JAMES H. MEANS: Could he have had an appendix abscess and a suppurative pylephlebitis?

DR. STEWART: That was the second best possibility in the minds of most of us. Dr. Young thought the fact that the mass was freely movable was rather unlike an appendix abscess. Also it seemed very well defined, seemed to be a pear-shaped body. Dr. Young said he had seen a case within a year parallel to that. That was an appendix abscess close to the abdominal wall, well defined and movable. So he still considered that a possibility.

A PHYSICIAN: The rest of his abdomen was comparatively soft?

DR. STEWART: Yes, except that he developed a certain amount of distention as he stayed on the ward.

CLINICAL DIAGNOSES

Acute hepatitis and cholecystitis.
Obstructing prostate.

ANATOMIC DIAGNOSES

1. *Primary disease.*

Acute and chronic cholecystitis.
Multiple abscesses of the liver.

2. *Secondary or terminal lesions.*

Hypertrophy of the heart.
Chronic passive congestion, general.
Benign hypertrophy of the prostate.
Vascular nephritis.

3. *Historical landmarks.*

Diverticulum of the duodenum.
Diverticulum of the bladder.

PATHOLOGIC DISCUSSION

DR. TRACY B. MALLORY: Autopsies on these very old people are rather apt to show one of two things. Either they have no anatomical pathology at all or they are museums of it. This man was in the latter class. The mass was unquestionably a very much dilated, acutely and chronically inflamed gall bladder. One of the reasons why it was so low in the abdomen was because there was marked enlargement of the liver due to one fairly large and multiple quite small abscesses. The cholecystitis and abscess of the liver were undoubtedly the chief pathology and immediate cause of death.

Among other findings were a very large diverticulum of the duodenum just at the edge of the papilla of Vater, the usual place for it. There was distinct cardiac hypertrophy, a quite marked degree of chronic passive congestion in the liver and other organs, a very distinct vascular nephritis and a diverticulum of the bladder which was referable to the large, greatly obstructing median lobe of the prostate.

A PHYSICIAN: Was there peritonitis?

DR. MALLORY: No.

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THE MORTALITY OF HEART DISEASE

ALTHOUGH the importance of heart disease as a major factor in the mortality statistics has been recognized by statisticians, public health officials and studious physicians, general understanding of the predisposing causes must be brought about before radical improvement in this serious impairment of human efficiency can be effected.

Medicine has accomplished much in the reduction of deaths due to the diseases of childhood, tuberculosis, typhoid fever, malaria, etc., aided by the more general coöperation of the laity. Hence it is incumbent on the profession to emphasize the etiologic facts with respect to heart disease in order to induce self-protection on the part of the people. The recognition of the early changes leading to fatal attacks of heart disease are often delayed until disability compels the victim to seek relief. Too many are ignorant concerning the dangers of infections and the effect of strain on organs which have become incapable of adjustment to unreasonable demands. The tendency of the average person is to give little heed to the circulatory apparatus until some embarrassment of function appears; then it may have become a symptom of organic change.

Since it happens too frequently that the first recognized evidence of heart disease is a fatal attack which is the culmination of more or less degenerative changes, more must be done to lead to the intelligent care of vital organs. This applies to doctors as well as to others for there is abundant evidence tending to indicate that physicians have not been examples of good behavior in caring for themselves.

Dr. T. F. Murphy, chief of the division of vital statistics of the Bureau of the Census, has been quoted in an interview as saying that "men above fifty are dying more rapidly mainly because of defective or over-worked hearts" and this in turn he believes to be due in some measure to the strain incident to the speed of business and modern methods of recreation. This means that the nervous tension of the modern business man is wearing on the vital organs and that too many seek relaxation in ways for which there may not be physical adaptation.

The problem is complicated but not without some possibilities of solution in many of its phases. Perhaps the most important field for preventive medicine as applied to diseases of the circulatory system will be found in reiteration of the facts.

Everybody should be told that infections, inadequate rest, undue strain and improper diet collectively or alone may reduce the normal life span. The several heart associations are doing good work in the publicity program, but thus far have not cultivated this field quite so intensively as has been done with tuberculosis.

Here, as in a general utilization of the accepted regulations employed in preventive medicine, the difficulty lies not in the lack of knowledge but in the meagre application of well-known facts.

The mortality of the human race would without doubt be reduced to an impressive degree if there could be a full understanding and use of the resources of prophylactic measures. Further progress will depend on education. Health understanding should be one of the goals of public education.

CHILD LABOR

THE Children's Bureau of the Department of Labor has recently completed a survey adding evidence to the well-known fact that the employment of child labor in the United States is detrimental to growth and physical development, deprives the individual of education, limits his development as a citizen and is industrially wasteful.

Certain phases of the survey are of particular interest. It was found, for example, that among employed continuation-school children in New

York State, twenty-eight per cent. of the defects were accentuated by their work. This is due largely to the loss of leisure time for play, which would otherwise develop children physically.

The death rate from tuberculosis among boys fifteen to nineteen years of age employed in Fall River cotton mills was nearly double that of boys not so employed. and among girls was far more than double that of girls not so employed.

A study in Cincinnati showed that school life favors general physical vigor and energy more than working life between the ages of fourteen and eighteen.

Children, it was found, are more prone to accidents than are adult workers. This is due to the thoughtlessness natural to their years, to ignorance, and to imperfect muscular coördination.

Although there is a tendency in modern legislation to prescribe an increasingly high age and educational standard for entrance into industry, a number of states still permit children to go to work before they have received the rudiments of elementary education.

Thus, more than half of the 19,696 children between the ages of fourteen and sixteen, who went to work in 1917 and 1918 in five states, had not completed the fourth grade. Less than three-fifths of all the fourteen and fifteen year old children taking out employment certificates to go to work in 1927 in the representative industrial communities reporting to the Children's Bureau had completed the eighth grade, and one-fourth had completed only the sixth.

These children are themselves hampered by their lack of vocational training, their faculties are blunted by long hours and monotonous work, and their entrance into competition with adult labor lowers the standard of adult wages.

The indictment against child labor is a serious one. It is unfair to the individual; it is unfair to society by promoting the physical deterioration of the race; it represents a political loss, and last, but not least, it is uneconomical and wasteful for industry itself.

A QUESTION WHICH MAY COME BEFORE THE COUNCIL OF THE MASSACHUSETTS MEDICAL SOCIETY

THE expenditure of the funds of a state medical society is an important matter because, even though there are enjoyable personal contacts and entertainments of a lighter sort, the main purpose of the society is the advancement of medicine and the social functions are, we assume, for the purpose of bringing into harmonious understanding the reactions of the different interests.

It is axiomatic that the development of friendly intercourse and the participation in games of various sorts tend to knit the component parts of a body primarily dedicated to serious work. In political life banquets, receptions and the various forms of hospitality have been regarded as powerful agents in harmonizing divergent interests.

Medical organizations are following the trend of the times with vaudeville, dancing and moving pictures to offset the monotony of the mental concentration of the scientific sections.

Recollection of the programs of former years and the almost austere behavior of the leading men of generations gone before may raise the question among our older members as to the part which some of these diversions play in the scheme of the modern medical meeting.

The consensus is evidently that some play with the work will bring refreshed mental power to the problems under discussion.

However committees of arrangements may respond to the wish of the members in the plan for social features, the main work of the society will go forward and public health activities, committees dealing with legislation, publicity programs and scientific section work will probably call for more financial support as the society becomes larger.

Practically everything costs more now than formerly and if the society is to keep its place in the forefront of medicine there will be ways in which money can be spent to advantage.

The annual dues have been eight dollars for many years and from this income a considerable rebate to the district societies is made.

Although the treasury reserve has been built up to good proportions there seems to be a likelihood of drawing upon invested funds unless some proposed expenditures are curtailed or more revenue secured. This is made evident in the annual budget prepared by the Committee on Membership and Finance.

The amount raised by other state societies may be of interest to our members if the question of increased dues is raised. The *Journal* has secured from all the state societies in this country the assessment levied by each, which is herewith presented.

DUES OF STATE MEDICAL SOCIETIES

Maryland	$21.00 (Baltimore City Members) 8.00 (County Members)
District of Columbia	20.00 (Active Members) 5.00 (Associate Members)
Idaho	20.00
Oregon	20.00
Minnesota	15.00
New Jersey	15.00
Arizona	12.50
California	10.00
Colorado	10.00
Florida	10.00
Maine	10.00

Michigan	10.00	
Nevada	10.00	(Includes *Journal* Subscription but not County dues)
New Mexico	10.00	
New York	10.00	(Plus County Dues)
Rhode Island	10.00	
South Dakota	10.00	(Includes *Journal* Subscription)
Texas	10.00	
Vermont	10.00	
West Virginia	10.00	(Plus County Dues)
Wisconsin	10.00	(Undoubtedly $15.00 beginning 1931)
Wyoming	10.00	($5.00 to General Fund; $5.00 to Medical Defense; Defense Fund now $7000.00 to the good)
Illinois	8.00	
Massachusetts	8.00	Non-residents $6.00 (Includes *Journal* Subscription)
Missouri	8.00	
Montana	8.00	
Nebraska	8.00	
Iowa	7.50	
Pennsylvania	7.50	
Georgia	7.00	
Indiana	7.00	
Kansas	7.00	
Louisiana	7.00	
North Dakota	7.00	
Arkansas	5.00	
Delaware	5.00	
Kentucky	5.00	(Includes *Journal* Subscription)
North Carolina	5.00	
Ohio	5.00	
South Carolina	5.00	
Utah	5.00	
Virginia	5.00	
Washington	5.00	
Connecticut	4.00	
Mississippi	4.00	
New Hampshire	4.00	
Oklahoma	4.00	($6 after February 1)
Tennessee	4.00	
Alabama	3.00	(Members)
	10.00	(Councilors)

The diversity in the amounts recorded may indicate to some extent the specific needs of the different states.

The time may come, if not already existing, when our Society may spend to advantage the income which may be derived from a larger assessment.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

AYER, JAMES B. M.D. Harvard 1907. Professor of Clinical Neurology, Harvard Medical School. His subject is: "Symptoms and Signs of Tumors Involving the Spinal Cord." Page 295. Address: 319 Longwood Avenue, Boston.

VIETS, HENRY R. B.S., M.D. Harvard 1916. Instructor in Neurology, Harvard Medical School. Assistant Neurologist, Massachusetts General Hospital. Consulting Neurologist, Newton Hospital. His subject is: "Diagnostic Service for Epidemic Meningitis." Page 301. Address: 6 Commonwealth Avenue, Boston.

LUNT, LAWRENCE K. A.B., M.D. Harvard 1914. Consulting Psychiatrist, Emerson Hospital, Concord, Mass. His subject is: "The Psychoneuroses in General Practice." Page 301. Address: Concord, Mass.

OBER, FRANK R. M.D. Tufts College Medical School 1905. Associate Surgeon, Children's Hospital, Boston. Surgeon-in-Chief, New England Peabody Home for Crippled Children. Surgeon to Poliomyelitis Commission, Vermont State Board of Health. Assistant Dean in Charge of Courses for Graduates, Harvard Medical School. His subject is: "Neuritis." Page 308. Address: 234 Marlboro Street, Boston.

REYNOLDS, GEORGE P. A.B., M.D. Harvard 1924. Assistant in Medicine, Harvard Medical School. Junior Visiting Physician, Boston City Hospital. His subject is: "The Etiology of Psychoneuroses Encountered in the Practice of Internal Medicine." Page 312. Address: 311 Beacon Street, Boston.

DALAND, ERNEST M. A.B., M.D. Harvard 1918. F.A.C.S. Chief of Staff, Pondville Hospital. Chief of Surgical Outpatient Department, Massachusetts General Hospital. Surgeon, Huntington Hospital. Address: 483 Beacon Street, Boston. Associated with him is:

PALERMO, ALFONSO A. A.B., M.D. Harvard 1927. Formerly, Resident Surgeon, Pondville Hospital. Address: 450 Sumner Avenue, Springfield. Their subject is: "Gastrostomy as a Palliative Measure." Page 317.

BATY, JAMES M. A.B., M.D. Harvard 1925. Assistant in Pediatrics, Harvard Medical School. His subject is: "Anemia in Infants and Children." Page 319. Address: 319 Longwood Avenue, Boston.

LANE, EDWARD A. A.B., M.D. Cornell 1916. Formerly, Assistant Director, Division of Communicable Diseases, Massachusetts Department of Public Health. Now, Director of Communicable Disease Control, Westchester County Health Department, White Plains, New York. Address:

Westchester County Health Department, White Plains, New York. Associated with him is:

ANDERSON, GAYLORD W. A.B., M.D. Harvard 1928. Assistant Director, Division of Communicable Diseases, Massachusetts Department of Public Health. Address: Massachusetts Department of Public Health, State House, Boston, Mass. Their subject is: "An Outbreak of Milk-Borne Sore Throat." Page 324.

FULTON, MARSHALL N. Ph.B., B.A., M.D. Johns Hopkins University 1925. Resident Physician, Peter Bent Brigham Hospital. Address: Peter Bent Brigham Hospital, Boston. Associated with him is:

ALT, HOWARD L. B.S., M.D. Northwestern University 1924. Resident Physician, Peter Bent Brigham Hospital 1927-1929. Their subject is: "The Comparative Effect of Different Iodine Preparations in the Preoperative Treatment of Thyrotoxicosis." Page 327.

THE BOSTON MEDICAL LIBRARY

MEDICAL BIBLIOGRAPHY

SOME people keep a dictionary to enable them to correct their errors in spelling and when they resort to it are content to see that they made no error in assembling, in their right order, the letters in the doubtful word. Others when they look up a word are concerned with the finer shades of its meaning and are interested to ascertain if the word chosen was one conveying the particular meaning that was intended. Some are looking for equivalents or synonyms. Still others are concerned with the derivation of the word and any attached etymological significance. There can be no question but that the reader or writer who uses a dictionary in this latter way is sure to benefit more by its possession than the one who is content to satisfy himself merely on the correctness of his orthography. All the information that a good dictionary provides would have been available for almost the same expenditure of time and effort.

Somewhat the same observation may be made in respect to the users of Libraries. Certain readers go to verify a reference; some to see what information they may gain on a topic about which they have no knowledge, nor any idea how to go about the task of acquiring it, at least in a way to ensure the greatest amount of benefit for the time expended. Still others go to inform themselves upon what others have written on a matter about which they themselves have considerable knowledge. A well arranged Library is a dictionary on a large scale and no one should be content to use it for the *least* that may be gotten out of it. Bibliographical research is interesting in itself, for when one has sought out all that has been said on a subject there is a satisfaction in that accomplishment alone. A number of books have been written on the topic as it applies to general literature which are of inestimable value to those working in this field. To a lesser extent is this true in respect to medical bibliography. The volume of medical literature is being so constantly added to and so frequently is there no way of determining the value of the article, monograph or whatever it may be, that the art of running to earth a particular clue is oftentimes a difficult one. Furthermore much that is written has no other excuse for occupying space in the columns of a journal and subsequently encumbering the shelves of a medical library than to keep the author in the public eye. Much of the difficulty that confronts those whose duty it is to attend to the accessions of a Medical Library would be overcome if the medical profession would learn to use the collection of books to which they have access in the broader bibliographic sense. If this were done many an author would not rush into print for he would learn that the value of his contribution is limited, at least in the form in which it is presented and not only would unprofitable duplication be avoided but his own mastery of the subject be greatly enhanced. It is probable that the decessions which a Librarian could make if he exercised his judgment in discarding literature of this description would furnish him shelf space for worth-while literature for some years to come. The custom of appending bibliographies which have never been thoroughly digested is a bad one for at least two reasons, entirely apart from its dishonesty. In the first place it breeds carelessness in the author, and in the second place it compels library authorities to keep much of this comparatively worthless material upon their shelves because so long as such references are included in a bibliography someone is sure to call for them and find fault with the library facilities if they cannot be produced. It is one of the objects of the Library Committee of the Boston Medical Library in striving to develop a bibliographic service to help in the cultivation of a discriminating sense of the value of current medical literature in order to assist the users of our Library and improve the character of their scientific and literary efforts thereby incidentally helping us in our accessions and decessions.

MISCELLANY

DR. EARL K. HOLT

Announcement has been made by Dr. George M. Kline, Commissioner of the Massachusetts Department of Mental Diseases, of the appointment of Dr. Earl K. Holt as Director of the Division for the Examination of Prisoners under that Department, to succeed Dr. Winfred Overholser, who was recently made Assistant Commissioner of Mental Diseases.

Dr. Holt, age 40, son of Henry and Anna E. (Bro-

sius) Holt, was born at Columbus, Indiana. He attended grammar school and Shortridge High School at Indianapolis and was graduated from the College of Medicine of Indiana University with the degree of M. D. in 1914. He was Assistant Physician at the Northern Indiana Hospital for Insane, Logansport, from 1915 to 1918, when he resigned to accept appointment as Medical Officer in the Neuro-Psychiatric Department of the Medical Corps of the U. S. Army. While at U. S. General Hospital No. 5, Fort Ontario, N. Y., March to September, 1919, Dr. Holt was Chief Educational Officer in charge of Occupational Therapy and Physical Reconstruction. After discharge from the Army in December, 1919, he received a commission in the Reserve Corps, U. S. Public Health Service, assigned to U. S. Veterans' Bureau, Washington, D. C. He was appointed Chief of Section of Neuro-Psychiatry, Central Office, Veterans' Bureau, in September, 1920. In September, 1923, he was appointed Psychiatrist of the Central Board of Appeals of the Veterans' Bureau, resigning from the Bureau in April, 1924, to become Assistant Superintendent of the Monson State Hospital, Palmer, Mass. Since December, 1928, Dr. Holt has held the position of Assistant to the Commissioner of Mental Diseases at the State House.

He was married at Cincinnati, Ohio, in 1917 to Dr. Evelyn Pearl Hyatt of Washington, Indiana. There is one child, Earl K. Holt, Jr., aged 9.

Dr. Holt is a member of the Massachusetts Medical Society, American Psychiatric Association, Massachusetts Society of Psychiatry, and is War Risk Insurance Officer of Merrill L. Simonds Post, American Legion, Palmer, Mass. For the past three years he has been the Hampden County Representative, on the State Hospitalization Committee of the Legion.

COMPARISON OF DISEASE INCIDENCE IN CONNECTICUT WITH 1929 AND SEVEN-YEAR AVERAGE

MONTH ENDING JULY 26, 1930

Diseases	1930 Week ending July 5	1930 Week ending July 12	1930 Week ending July 19	1930 Week ending July 26	Average cases reported for week corresponding to July 26 for past seven years	1929 Week ending July 6	1929 Week ending July 13	1929 Week ending July 20	1929 Week ending July 27
Cerebrospinal Meningitis	1	1	5	2	1	1	1	2	2
Chickenpox	30	11	20	9	13	28	25	14	5
Diphtheria	5	1	20	6	18	10	17	10	13
Dysentery Amoebic	—	—	—	1	—	—	—	—	—
Encephalitis Epidemic	1	—	—	—	—	—	—	—	—
German Measles	14	11	8	3	2	15	6	8	3
Influenza	—	1	1	—	2	—	1	1	4
Malaria	—	—	1	—	2	—	—	—	1
Measles	20	20	17	8	46	49	36	22	18
Mumps	19	16	12	7	8	20	17	9	7
Pneumonia (Broncho)*	4	6	4	8	11	10	7	8	10
Pneumonia (Lobar)	13	10	14	8	9	10	7	6	19
Poliomyelitis	—	—	—	4	2	—	—	—	2
Scarlet Fever	16	7	8	10	15	18	19	9	11
Septic Sore Throat	—	—	—	—	—	2	13	1	—
Tetanus	—	—	1	—	1	—	—	1	1
Tuberculosis (Pulmonary)	22	13	42	17	38	17	31	28	21
Tuberculosis (O. F.)	1	1	3	4	3	—	3	2	1
Typhoid Fever	1	1	2	2	5	3	2	1	1
Undulant Fever†	—	—	1	—	—	—	—	—	—
Whooping Cough	21	38	29	40	56	35	12	23	62
Gonorrhea	21	16	32	18	30	23	36	33	22
Syphilis	30	31	56	19	33	25	34	31	34

Remarks: No cases of Asiatic cholera, glanders, plague, rabies in humans and yellow fever during the past seven years.

*Made reportable January 1, 1925.
†Made reportable July 1, 1928.

WARNING CONCERNING TYPHOID FEVER AND PELLAGRA

Surgeon General Cumming has been quoted to the effect that an increase of typhoid fever may be expected as a result of the drought unless strict sanitary precautions are taken.

Already more cases are reported than in the same period of the preceding year.

He is further reported to have said, "Should fruit and vegetables become scarce, or prices rise so as to remove them from the tables of poorer people, pellagra and other diseases resulting from improper nourishment would follow".

FRANCE'S NEW SOCIAL INSURANCE LAW

Since July 1 all employed persons above school age in France must be insured against sickness, invalidity, and old age if their annual incomes do not exceed certain minimum sums, differing for workers in cities and rural districts and according to whether or not there are dependent children. The sickness benefit, consisting of medical, surgical, and hospital care with medicines, as needed, applies also to the wife and dependent children under 16 of the insured person; it carries also a cash benefit for the insured person. All insured women and the wives of insured men are entitled to medical aid during pregnancy and six months after childbirth, and a cash benefit is allowed for six weeks before and six weeks after confinement if the mother gives up her regular employment. A small extra benefit is also given to a woman who nurses her baby. — *Bulletin Children's Bureau.*

CORRESPONDENCE

THE RESIGNATION OF DR. REMICK AND APPOINTMENTS OF DR. POPE AND DR. POUTAS

The Commonwealth of Massachusetts
Department of Public Health
State House, Boston

August 12, 1930.

Editor, *New England Journal of Medicine,*

The Public Health Council today accepted with a great deal of regret the resignation of Dr. Sumner H. Remick as Director of the Division of Tuberculosis of this Department. After wide administrative experience at the Sassaquin Sanatorium in New Bedford, Dr. Remick was appointed by Dr. Eugene R. Kelley, the former Commissioner, to direct the tuberculosis activities of the Department some ten years ago. At about that time the four State Sanatoria had been transferred from a Board of Trustees to the Department. There has been notable improvement and extension of the physical equipment of the institutions, and then, too, the type of service has changed during this period so that two are now serving children, and one, bone and joint tuberculosis. During this period also there has been marked development of the county institutions and the ten year program against juvenile tuberculosis in the schools was organized and has functioned for six years. During all this time, Dr. Remick and Dr. Kelley directed the development and looked wisely into the future. Now, Dr. Remick is leaving to become superintendent of the Middlesex County Sanatorium which will be opened in about a year. He will contribute notably not only to the work inside the institution but to the even more important work outside the institution which will bring more and more cases to our hospitals in a stage of the disease favorable for cure. Perhaps through his contribution in this field he may be of more value to the ultimate conquest of tuberculosis in the State than had he remained with the Department.

The Council has appointed as his successor, Dr Alton S. Pope, who was educated at Bowdoin College, spent a year at Harvard-Technology School of Public Health in 1920, and graduated from Tufts College Medical School in 1924. A year later he received a degree of doctor of public health at the Harvard School of Public Health. He has had experience as a district health officer with the Maine Department of Health, as assistant professor of epidemiology at Columbia University, and as assistant attending physician at the Willard Parker Hospital in New York. Previous to coming to the Department he was chief of the bureau of communicable diseases in the Chicago Department of Health, and lecturer on epidemiology and statistics at the University of Chicago. Last fall he came to the Massachusetts Department as epidemiologist in the Division of Tuberculosis and has set up a notable study of the past and present situation in regard to tuberculosis in this state. With our school clinic information, our hospital records and our data on cases and deaths, the latest going back to 1850, there is probably no place in the country where more rich material is available. From this, we hope to obtain precise data in regard to what has been accomplished in this field in Massachusetts which may be used for modifying future policies. For the last ten years there has been marked progress in the institutionalization of this disease. Although our institutions must be adequately maintained, improved and expanded, the real progress in the next ten years will probably be made outside the institution through the early recognition of cases and the adequate follow-up of the discharged patients. Dr. Pope through his wide epidemiological experience promises to make a real contribution in this field.

Dr. John Poutas, graduated from the Harvard Medical School in 1930, has been appointed as epidemiologist in the Division of Tuberculosis to succeed Dr. Pope and carry on his studies.

Yours truly,
GEORGE H. BIGELOW, M.D.,
Commissioner of Public Health.

A GENEROUS GIFT TO THE BOSTON MEDICAL LIBRARY

8 The Fenway, Boston 17, Mass.

August 2, 1930.

Editor, *New England Journal of Medicine,*

Kindly note in the *Journal* that the library has recently received from the Godfrey M. Hyams Trust

the sum of $25,000 for the purpose of establishing and maintaining a collection of books on Jewish Medical subjects. This particular fund will be of great value to the library, and the Medical profession, as it will enable the library to buy many books, which are needed to supplement the Bullard, and other historical collections in the library.

Previous to this contribution, we received from the Jelly Estate, the sum of $1112., to establish a fund, the income of which is to be used for the purchase of books on neurology.

The Library is very glad to receive such funds which make possible the purchase of books which cannot be bought from the income of the regular funds.

The sum of $200 has been received from the estate of Dr. Vincent Y. Bowditch to be added to the Bowditch fund.

Yours very truly,
JAMES F. BALLARD, *Director.*

NEWS ITEMS

THE AWARD OF THE OPHTHALMIC RESEARCH MEDAL TO DR. F. H. VERHOEFF—At the recent meeting of the American Medical Association in Detroit, the Ophthalmic Research Medal was awarded to Dr. Frederick H. Verhoeff of Boston.

DR. JOHN F. FULTON WILL SOON TAKE UP HIS RESIDENCE IN NEW HAVEN—Dr. John F. Fulton has accepted the appointment of Sterling Professor of Physiology at Yale University.

Dr. Fulton graduated from the Harvard Medical School in 1927, and after a year's work with Dr. Harvey Cushing engaged in research work on the nervous system at Oxford under Professor Sherrington.

All communications should be sent to the Department of Physiology, Yale Medical School, New Haven, Connecticut.

RECOGNITION OF WORK DEALING WITH THE GOITER PROBLEM—At the recent meeting of the American Association for the Study of Goiter at Seattle, Washington, Doctor William F. Rienhoff, Jr., of Johns Hopkins University, Baltimore, Maryland, received the annual award of $300 for the best essay dealing with the goiter problem. Doctors O. P. Kimball, of Cleveland, Ohio, and E. P. and D. R. McCullagh, Cleveland Clinic Foundation, Cleveland, Ohio, and Robert P. Ball, of the University of Louisville, received honorable mention.

NOTICES

UNITED STATES CIVIL SERVICE EXAMINATION

The United States Civil Service Commission announces the following open competitive examination:

Biologist

Applications for biologist must be on file with the Civil Service Commission at Washington, D. C., not later than September 17, 1930.

The examination is to fill a vacancy in the United States Public Health Service, for duty at Boston, Mass., and vacancies occurring in positions requiring similar qualifications throughout the United States.

The entrance salaries range from $3,800 to $4,400 a year. Higher-salaried positions are filled through promotion.

The duties are to carry on, under general supervision, advanced biological researches, either individually or in coöperation with others, on animal and human materials, with particular reference to the acceleration or inhibition of cellular growth and similar related researches of a fundamental nature. The Public Health Service is engaged upon such studies, the immediate object of which is to discover some new facts bearing upon the cause and treatment of tumors. The vast amount of work heretofore done on malignant growths testifies to the difficulties involved in such studies.

Full information may be obtained from the United States Civil Service Commission, Washington, D. C., or from the Secretary of the United States Civil Service Board of Examiners at the post office or customhouse in any city.

UNITED STATES PUBLIC HEALTH SERVICE

Assistant Surgeon C. B. Spencer, U. S. P. H. has been relieved from duty at Marine Hospital, Baltimore, Md., and assigned to duty at Marine Hospital, Boston, Mass.

Assistant Surgeon General Walter L. Treadway has been directed to proceed from Washington, D. C., to Boston, Mass., and such other points in the State of Massachusetts as may be deemed necessary, and return, to make studies and investigations incident to carrying into effect the provisions of the Act, to provide for the coördination of the public health activities of the Government and for other purposes, approved January 19, 1929.

SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

March-October—International Medical Postgraduate Courses in Berlin. Complete notice appears on page 853, issue of October 24, 1929.

September 8-12—Postgraduate week of Physical Therapy. Detailed notice appears on page 1025, issue of May 22.

September 14-18—Fifth International Congress on Physiotherapy. Complete notice appears on page 906, issue of October 31, 1929.

September 16-17-18—Clinical Congress of the Connecticut State Medical Society. Complete notice appears on page 194, issue of July 24.

September 26-27—New England Surgical Society. Detailed notice appears on page 1028, issue of May 22.

October 13-17—Clinical Congress of the American College of Surgeons. Complete notice appears on page 1175, issue of June 12.

October 20-24—International Assembly of the Interstate Postgraduate Medical Association of North America. Detailed notice appears on page 291, issue of August 7.

October 27—The American Public Health Association. Detailed notice appears on page 1271, issue of December 19, 1929.

March 23-27, 1931—Fifteenth annual clinical session of the American College of Physicians. Detailed notice appears on page 790, issue of April 17.